METAL INDUSTRY

WITH WHICH ARE INCORPORATED

ALUMINUM WORLD & COPPER AND BRASS

BRASS FOUNDER and FINISHER

ELECTRO-PLATERS REVIEW

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ELECTRO-PLATERS REVIEW

VOL. 33 NEW YORK, JANUARY, 1935 No. 1

Stamped Metal Products Manufacturing

By W. B. FRANCIS

Associate Editor

A Series of Articles on the Processes and Methods Involved in Making Stamped Metal Products Preparatory to Plating and Finishing—Part I

THE cutting of thin sheet metals into any desired shape, and the forming of the pieces by bending, pressing or drawing into serviceable or ornamental articles would seem to be so simple that a cave man could do it. In fact it can be done by hand with the use of a few elementary tools. But when it comes to the cutting and the forming of sheet metal pieces by the millions in an endless variety and in very limited spaces of time, and at a trifling cost the problem becomes too complicated for untrained minds to understand. The problem has now become that of mass production by the masses.

The Basic Material—Sheet Metal

Sheet metal articles are now made in such an endless variety of kinds and sizes, and of finishes for durability and beauty, that the selection of metals, materials, processes and equipment becomes a series of tedious technical investigations. Most metals are available in the sheet form. Iron and steel are used in the largest tonnages. For cheapness and general utility, and in number of fashions in "dress up," they lead the market parade. Vast quantities of aluminum, copper, brass and bronze, zinc, nickel, tin, lead and alloyed combinations too numerous to figure, are in the daily market quotations. Sheet metals are supplied by the mills in practically any lengths and widths, thicknesses, and quantities required by the stamping factories where they are sheared, blanked, and drawn into the finished shapes. In order to avoid waste of metal and the cost of handling the scrap, the sizes of sheets to produce a given formed piece or number of pieces, is figured very closely before the order is placed. Thus it happens that the design of the piece is completed, and the tools for forming it are made and tested before the mill order is released. The method today is not "What have you?" but "We want so many tons of sheet as per specifications." Those who order only on price and from any stack of stock often get off grades or dirty iron. The specifications in real orders may cover everything that features the size, composition, surface finish, etc. down to the metallographic structure of the grain.

For descriptions of the various kinds of sheet metals, the manufacturer of stampings needs to make a constant use of sheet metal directories, or stock lists, and quotation sheets.

Machine Equipment

Stamping and forming, or drawing presses are the key machines in factories that make sheet metal articles. These machines range in size from the little fellows that make shoe eyelets and smaller pieces up to the mammoth machines that form automobile bodies and pieces even larger. Other equipment in such factories embraces shearing machines, punches, nibbling machines, rolling and straightening and bending machines, and sets of dies for all the shapes and sizes manufactured. Furnaces are also needed for heat treating the hardened metals. The making of the dies requires a machine shop equip-

ment of lathes, shapers, slotters, millers, saws, grinders, polishers and die sinkers that may be either automatic or manual in operation.

Punching and Stamping Presses

A typical up-to-date punching press, and set up to cut blanks from strip steel is illustrated in Figure 1. The punchings may be the pieces required, or the skeleton strips when cut in lengths may be what are wanted. In either case the punch must have a certain size and shape, and the die must be located in the bed of the machine under the strip, and so that the punch will enter it perfectly. The opening through the die is slightly larger than that of the punch to allow for clearance. Also, the bottom of the die opening must be considerable larger than that in the top so that the blanks may drop through freely.

The press in Figure 1 has a heavy flywheel shaft with a short crank that gives the vertical movement to the sliding head that carries the punch. The cutting die is bolted securely to the bed or shoe of the

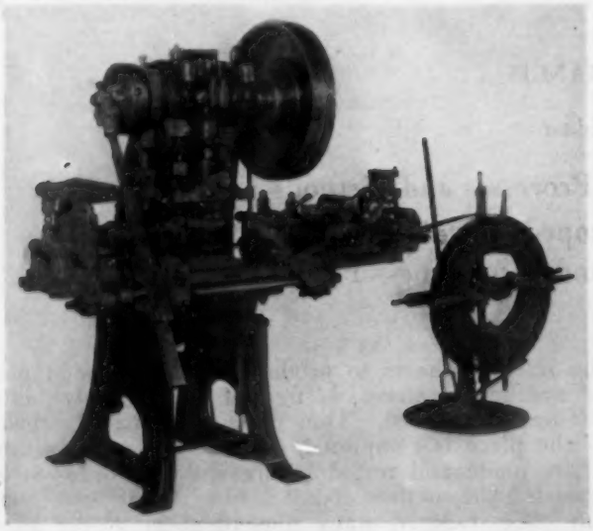

Fig. 1. Punch Press with Automatic Feed, Scrap Cutter and Automatic Centering Reel

press. The stock as illustrated is bright steel strip. It is carried on a vertical reel, which is self centering and always keeps the coil tight and in balance. The outside end of the strip is fed from the right to the left through the die set automatically. The strip first passes through the oiler, then through the straightener to the rolls that feed it over the die and exact distances for spacing the centers of the punched holes. A pair of rolls at the left take the scrap, if any, away from the die, and a cutter delivers it in small pieces to the scrap box. The stampings whether consisting of the punchings or the lengths of skeleton strip, flow either forward or backward from the press into the work box. Presses of this type can produce from 40,000 to 80,000 pieces per day. A counter on the machine records the production.

Die Sets

The business parts of stamping and drawing presses are the die sets. The parts of a die set and their mountings are illustrated in Figure 2, which is a patented design. The punch is held in a special retainer that is attached by cap screws to the moveable head, or slide of the press. The die is held by cap screws to the die shoe that is bolted to the bed of the press. The sheet metal rests on the die. The illustration shows the punch as having passed through the sheet, and continued far enough to move the punching, or blank, into the clearance hole through the die, where it falls by gravity from the press. A special feature of this punch retainer is a latch that engages the shank of the punch, so that the punch may be easily and quickly changed.

An additional part usually used with a die set is a stripper. This is located above the die and arranged around the punch. Its purpose is to force the punched sheet from the punch as the punch rises on its return stroke. The punch is likely to be broken where a stripper is not used. The stripper also serves as a guide for the punch, which may be important, especially with small punches.

The pressures required to punch sheet metals range

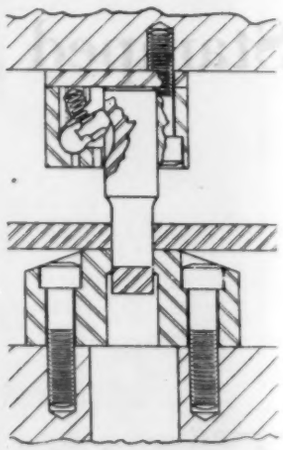

Fig. 2. Die Set for Punch Press

anywhere from one to over 100 tons. The pressure depends on the kind of metal, its condition and thickness, and the size of the hole, etc. The theoretical pressures for punching various shapes and sizes of holes in the usual ferrous and nonferrous stocks are given in catalogues, hand books, and technical periodicals. The standard formula for making the calculations is P = L x T x S where P is the pressure in pounds, L is the length of the boundary of the hole, T is the thickness of the sheet, and S is the hearing strength of the metal. Thus, the pressure needed to punch a ⅝ in. hole in 5/16 in. low-carbon steel having a shearing strength of about 50,000 pounds per square inch, is approximately as follows: P = ⅝ x 3.1416 x 5/16 x 50,000 = 30,624 lbs.

This Article will be continued in an early issue.—Ed.

Powdered vs. Lump Rosin

Q.—We have been having trouble with the rosin that we use in connection with our lead plating tank. Will you kindly advise us just where we can secure the proper type of rosin and also its trade name or the proper designation.

The following is the solution that we have been using in this lead plating for the past 6 years.

Water, 1 gal; caustic soda, 76%; lead acetate crystallized, 8 ozs.; powdered yellow rosin, ¼ oz.

A.—Powdered rosin sometimes contains more impurities than the lump form. We would suggest that you buy the lump rosin and do the powdering yourself.

O. J. S.

The Metal Industries

A Symposium on Their Record in 1934 and Prospects for 1935

Copper

By
WILLIAM G. SCHNEIDER
Formerly of the Copper & Brass Research Association, New York

BUSINESS conditions in the United States as a whole, in 1934 showed further improvement as compared to 1933. The copper industry shared in this improvement. Of outstanding importance was the approval as of April 21, 1934 of the Copper Producers Code bringing into being Blue Eagle Copper and which provided for sales quotas for primary producers as follows:—

	Tons per Annum	Monthly Percentage Sale Quotas
Kennecott Copper Corporation	366,500	1.67%
Anaconda Copper Mining Company	225,000	1.67%
Phelps Dodge Corporation	168,000	1.67%
United Verdi Copper Company	68,000	1.90%
Calumet Hecla Consolidated Copper Co.	50,000	2.20%
Miami Copper Company	36,000	2.30%
Magma Copper Company	25,000	2.50%
United Verdi Extension Mining Co.	24,000	2.50%
Consolidated Copper Mines Company	21,000	2.70%
Copper Range Company	17,500	3.00%

In addition, secondary copper producers were allotted 9,500 tons per month.

The pressure of secondary copper was such that toward the end of the year primary producers agreed, at a Copper Code Authority meeting, to a Waiver of their priority rights under the Code and extended this privilege on November 27th till January 31, 1935, so that custom smelters could dispose of their intake of 10,250 tons a month.

Exact tonnage figures are not available but it is estimated that total United States production of copper was about the same as in 1933. Total consumption in the United States for 1934 is estimated as 435,000 tons as compared to about 390,000 tons in 1933. Total world stocks of copper are estimated to have decreased 200,000 tons during the year; and the refinery stocks about 150,000 tons from the stocks of about 510,000 tons held on January 1, 1934.

These estimates indicate definite improvement in the copper industry. Furthermore, the tonnage of fabricated products used in 1934 is estimated to be about 10% above last year's demands.

There is, at this writing, considerable discussion regarding a world copper conference to adjust world production and possibly balance it against consumption.

Here in the United States stocks are being reduced; scrap is assuming its position in the picture, and if present practices continue, it won't be long before a more substantial indication of actual betterment is assured.

In 1935 the automobile industry, building, refrigerators, and the electrical trades should show more pronounced signs of recovery and consequently greater consumption of copper.

Zinc

By
W. R. INGALLS
Director, American Bureau of Metal Statistics, New York

THE production of zinc in the United States in 1934, has been about 365,000 tons, compared with 325,000 in 1933. The deliveries have been about 350,000 compared with 344,000 in the previous year. Consequently there has been an increase in the stocks of spelter in first hands. The increase in production occurred in spite of labor troubles in Montana that curtailed production there during four months of the year. The smallness of the increase in deliveries was disappointing, but was in line with the general recession in industrial activities in the second half of the year. Comparing 1934 with 1933 there was increased use of spelter for brass making and for die casting, both being associated closely with the manufacture of motor vehicles and mechanical refrigerators, but there was probably decrease in the use of zinc for galvanizing, although illuminating statistics under these heads are not yet available.

Besides the increase in the stock of spelter at metallurgical works there was a small increase in the stock of ore at mills in the Tri-State district, but on the whole the production in that district was kept in close step with the requirements by smelters.

Outside of the United States production in 1934 will probably prove to have been about 915,000 short tons, compared with about 779,000 in 1933. Notwithstanding this substantial increase in production there was a reduction of about 24,000 tons in the stock of

spelter in first hands up to the end of October, a strong increase in consumption being thus reflected.

While the statistical position of the metal abroad has improved so brilliantly, and while the quantity of ore stocks at metallurgical plants appears to have been stationary, there has probably been some accumulation of zinc in ore at the mills of origin, which may be the explanation of the low level of price that has continued to prevail.

The year draws to a close with a good deal of upset in European conditions, underlying reasons being nationalistic restrictive measures, through tariffs and otherwise, the beginning of production at new plants in Germany and Great Britain, dislocating ore supplies, markets, etc. Composition having proved impossible the International Cartel after a duration of five years comes to an end with 1934.

Tin

By
C. L. MANTELL
Consulting Engineer,
New York

IN COMPARISON with previous years, the world production of tin and the prices have shown an unusual stability. Tin control, as a result of agreement between the governments of Bolivia, the Malay States, the Netherlands East Indies, and Nigeria, is an accomplished fact. The scheme with its many ramifications, is operating more smoothly and advantageously than had been predicted. Tin is seeking new outlets through research and development committees, as well as attempting to hold old customers.

For the yearly period ending in May, 1934, the consumption of tin by the tin plate industry throughout the world amounted to 55,000 tons, the highest total recorded for any similar period. This is 5,000 tons more than the 1929 peak and 2,800 tons in excess of 1933. World consumption of tin over the same yearly period amounted to 129,600 tons as against 101,765 tons for the 1932-33 term. The United States increased its use of tin from 38,470 in the twelve months ending May, 1933, to 58,117 tons in the 1933-34 year. The motor car industry of the world consumed over 6,000 tons of tin for the first six months of 1934 as compared to 3,600 tons in the corresponding six months in 1933.

Production was maintained throughout the year at about 40 per cent of normal in the various tin producing countries. The same quotas were retained for the first quarter of 1935.

The bright spot in the tin business was in tin plate and its use in tin containers. Can makers were prosperous as a result of the drought in the United States, the slaughter of drought cattle, some 4,000,000 of which were shipped. Each steer required about 175 cans. It is interesting to compare this 500,000,000 can requirement with the estimated annual requirement of 1,000,000,000 cans for corn, tomatoes, and peas which normally utilize the greater share of the containers. Lubricating oil in cans "went over." Beer in cans is finding new consumers for both the container and the contained. The United States now has 58 can making plants distributed at strategic centers.

In the world tin plate market, by agreement Wales was allotted 55 per cent, the United States 22 per cent, Germany 16 per cent, and the remaining 7 per cent divided between Italy and France.

With the return of tin to prices above 50 cents, development of substitutes have continued. Tin foil suffers more and more from other wrapping materials such as aluminum, zinc, and cellophane. In bearing alloys for high speed motors operated at higher temperatures, the "leaded bronzes" of copper and lead are competitors which are growing stronger. An interesting development is seen in the consumption of tin powder for pressed metal parts, synthetic alloys, and coatings.

Tin plating has been the subject of development as well as new applications without any appreciable increase in consumption of metal. Tin salts are also meeting competitors that are taking portions of the market in enamelling, the textile industries, and coatings of various natures.

Just as in 1934, when the course of the tin business was determined by economic conditions as well as control policies, it is expected that 1935 will present a similar picture.

Lead

By
F. E. WORMSER
Secretary, Lead Industries
Association, New York

NUMEROUS interesting new applications of lead in 1934 again demonstrated the adaptability of this useful metal to a wide variety of services.

For example, in the form of an alloy (mixture) of copper and lead, containing from 15 to 45 per cent of lead, automobile bearings were produced and adopted as standard equipment by some automotive engine manufacturers. Although this type of bearing has been used for some years in aircraft motors, it has only recently been introduced on a commercial scale in the automobile field.

Solder is an ancient lead-tin alloy and to encourage its use by the householder and others who have simple soldering to do, one enterprising manufacturer has begun to market a genuine lead-tin solder in paste form, mixed with a flux and put up in attractive collapsible tubes. This solder should not be confused with so-called "liquid solders" now on the market

which are nothing more or less than a cement, often made of aluminum dust, with an inflammable vehicle.

An important alloy of lead was placed on the market during 1934, known as tellurium lead. This usually contains .05 to .06 per cent of tellurium and possesses physical and chemical properties that promise to give this product a useful place in industry. For one thing, the alloy work-hardens and has a high resistance to corrosion by sulphuric acid. Experimental work reported by Singleton has shown that overstraining 12½ per cent in tension tellurium lead continues to increase in strength until 21 per cent greater strength is reached after six months, whereas under similar test, ordinary lead shows 12% loss in strength. Tellurium lead is noted for its uniformly fine grain structure and is said to have a comparatively high resistance to vibrational fatigue. It is finding an application as anode and tank lining in chromium plating operations and in storage batteries, and as manuafcturers become more familiar with its properties in actual operation, it is expected to have applications in many lines.

As a protection to buildings from destruction by termites, sheet lead is being recommended for placement on top of masonry building foundations and extending outward and downward on each side of the foundation walls for about 2".

On account of its extraordinary durability lead is an excellent material to use for the construction of grave vaults or caskets and it is surprising that not more of it has so far been used for the purpose. However, in Atlanta, Ga., a grave vault was constructed of wood or other suitable materials and covered on the outside with sheet lead and placed on the market.

Lead's well known quality as a sound deadening or sound-proofing material were used in constructing all the studio doors of the National Broadcasting Company in its new quarters at Radio City, N. Y. which are of laminations of wood and sheet lead.

Nickel and its Alloys

An abstract of The Nickel Industry in 1934 by ROBERT C. STANLEY, President, International Nickel Company

THE year 1934 was decidedly encouraging. World consumption for the first ten months was 102,780,000 pounds compared with 77,600,000 in 1933 and 49,500,000 in 1932.

The Government's campaign to stimulate home modernization is likely to be of extreme importance to the nickel industry in the increased use of modern kitchen and plumbing facilities, which will require Monel metal, nickel-chromium alloys and nickel-silvers. The automotive industry continues to be the world's largest consumer of nickel. The railroads should also be larger consumers, due to the trend toward greater speeds and lighter weights which will stimulate the use of nickel alloys, such as nickel-aluminum, nickel-copper, nickel-chromium, etc., in Diesel engines. In marine construction, cupro-nickel tubing for condenser service has accounted for a large additional tonnage. Diesel engines and steam turbines use Monel metal and pure nickel. Monel metal is being adopted for boiler feed storage tanks and also for hold linings and shafts in fishing vessels. In aviation, Monel metal is being used for the pontoons of seaplanes and the skis for winter service.

The development of special nickel-containing alloys in the non-ferrous foundries has gone on steadily. Approximately a million pounds of nickel a year are consumed in nickel silvers and in the use of nickel as an addition agent in bronze foundry mixtures. Another development is a silicon-alloyed Monel metal.

In public works projects Monel metal has become established for such uses as in the filtration of conditioned sewage sludge, for grout stops which serve as expansion joints and seals in the concrete forming the masonry of a dam, for the valve seats of huge water gates and for screws and bolts to fasten the seats in place.

Nickel is widely used in the textile industries, such as rayon, the bleaching and dying of all textiles and their laundering or dry-cleaning. In the food industries, large tonnages are used of Monel metal, pure nickel and Inconel in preparing, handling and serving foods and drinks; also for bottling equipment.

Coinage of nickel has increased by the addition of one more country which adopted this metal for currency and three new denominations now being minted by countries already using nickel for coinage. The use of nickel and nickel alloys for jewelry and ornaments was extended considerably during 1934, the metal going into belt buckles, rings, tie clips, eye-glass frames, etc. Pure nickel continues to be used extensively in vacuum tube manufacturing for radio and other applications.

In nickel plating there has been unusual development. A much heavier deposit is now being used than formerly. Also a considerable amount of interest has been aroused in the bright nickel solutions which eliminate a large part of the buffing and polishing operations. It is interesting to know that electroplating now consumes about 10 per cent of the total output of pure nickel compared with only 5 per cent in 1926.

Aluminum

By
S. K. COLBY
Vice-President, Aluminum Company of America, Pittsburgh, Pa.

WITH the market still leaving much to be desired in the demand for capital goods but with an improvement in the broader classification now known as durable goods, aluminum is showing an activity 70 per cent better than the low ebb of the four-year sub-normal period from which we are emerging. Indications for this industry are encouraging in view of the wide variety of fields in which the metal is used.

In the durable goods field which includes capital expenditures, aluminum has made rapid strides during the past twelve months with transportation leading the procession. Railroad activities in streamlined trains attracted the greatest public interest. The

Union Pacific System with its three-car, all-aluminum, articulated train placed in service in February and its six-car train of the same type, inaugurated in October, served to focus attention on aluminum alloys. The Union Pacific is placing in service in the near future two nine-car, all-aluminum trains of the same general type.

Other railroad developments in aluminum rolling stock include a three-car train now being built for the New York, New Haven and Hartford and an eight-car train for the Baltimore and Ohio. In New York a five-section aluminum car has been placed in subway and elevated service for the B. M. T. lines. The Baltimore and Ohio is conducting an interesting test with an all-aluminum hopper car.

In the construction of truck bodies aluminum experienced its most successful year. In addition to its use in coal trucks, meat trucks, milk carriers, moving vans and delivery trucks, the past few months have seen the introduction of stream-lined aluminum bodies for petroleum trucks and chassis-less aluminum carriers to transport automobiles from factory to dealer.

The automotive field, where aluminum has long played an important role, saw its principal development of the year in the application of alumilite finish to pistons. This process forms a hard, smooth, aluminum oxide surface which becomes an integral part of the metal itself. In aviation the giant Sikorsky air liner and the new Douglas liners of light alloy construction drew attention to aluminum which is essentially the metal of the air. On the water two events brought aluminum to the fore. One was the success of the aluminum-masted Rainbow in the international cup races. The other was the Morro Castle disaster, calling attention to the need for fire proof construction in the superstructures of ships, a departure where research and exhaustive tests have proven the value of aluminum.

The use of aluminum for architectural purposes especially in the decorative field has shown activity despite the small volume of building. In Newark, N. J., the new Pennsylvania station is a striking example. In Chicago aluminum escalators are an outstanding feature of the new Marshall Field store. The trend toward "stream-lined" rooms in interior decorating saw the alumilite finish playing an important role. The use of aluminum in statuary received attention through the erection in Washington of the Navy and Marine Memorial, an all-aluminum conception acclaimed a masterpiece in contemporary metal work.

As a useful metal for every-day necessities, aluminum constantly widens its field. In paints, aluminum paste as well as powder is now available for pigment. In the brewing industry and the milk industry aluminum continues to spread its uses because of its light weight and sanitary features. Bottle closures of aluminum have shown a heavy increase during the year as have uses for aluminum foil. While no new aluminum alloys were introduced during the year, several which made their debut during 1933 have found wider application. Likewise those placed in practical use in 1933 have given good results.

Gold and Silver

By
G. H. NIEMEYER
Vice President, Handy & Harman, New York

Gold

In our opinion, there was a somewhat larger amount of gold used for manufacturing purposes in 1934 than in 1933, even though there has been a tendency—because of higher prices—toward using gold of lower fineness wherever possible. The effort to compensate for the rapid and considerable increase in gold prices by offering articles of lower fineness or karat to sell within the old price ranges for higher qualities is natural under the circumstances, and has also led to more extended use of gold filled stock and thinner rolled plate in place of heavier plate.

Increasing gold prices during 1933 brought out large quantities of discarded old jewelry held by the public, and supplies from this source continued at a heavy rate through 1934. Much of this old gold has found its way into the United States Treasury, through the Assay Offices and Mints but a large quantity has also been handled by refiners and returned to industry for manufacturing purposes.

At the beginning of the year 1934, the Reconstruction Finance Corporation was the established Government agency for handling gold transactions, having been authorized under date of October 25th, 1933, to purchase newly mined American gold, and to buy or sell gold in the world market. The price quoted by the Reconstruction Finance Corporation at the beginning of the year was $34.06 per ounce, which continued until January 16th, when this function was transferred to the Treasury Department and the price became $34.45 per ounce. On January 31st, the President issued a proclamation fixing the weight of the gold dollar at 15 5/21 grains, 9/10 fine, which established the price of gold at $35.00 per ounce. The latter rate has continued up to the present time.

Under the President's Proclamation of January 31st, provisional gold regulations were issued by the Treasury Department which involved some changes in license requirements, and provided conditions under which purchases and sales would be made by the Treasury Department at the new price. In the main, these regulations excluded the purchase of melted secondary gold of domestic origin, but provided for the resumption of sales to the Arts and Industries under license for manufacturing purposes.

Secondary gold prices at the beginning of 1934 were quoted in the neighborhood of $27.00 per oz., which was the low for the year. During the year, secondary prices fluctuated with supply and demand, but gradually increased as Government rates were raised and as some of the secondary supplies began to find their

way into the Treasury under the regulations of January 31st. Secondary gold prices closed at the end of 1934 at approximately $35.00 per oz.

Silver

OUR estimate of world production during 1934 is 181,200,000 ounces which is somewhat higher than in 1933. The United States supplied 25,500,000 ounces, Mexico 75,000,000 ounces and Canada 16,300,000 ounces. Production figures in the United States show an increase of 4,100,000 ounces; in Mexico 5,900,000 ounces and in Canada 900,000 ounces. The total output for the year showed an increase over 1933 of approximately 10% but in the case of the United States the gain amounted to nearly 22% which is not surprising in view of the fact that the Government paid domestic producers a premium above the market of 10c. to 20c. per ounce.

We estimate that about 25,000,000 ounces of silver were used during 1934 by the arts and industries in the United States and Canada, an increase of 1,000,000 ounces over the previous year's consumption. About half of this total was employed in the manufacture of silverware, but, as compared to 1933, there was a decrease of some 15% in the amount used for sterling silverware, and an increase of 25% for silver plated ware. There was practically no change from the preceding year in the amount used for jewelry and dental products, and the chemical industry also absorbed about the same quantity, mostly for making silver nitrate for motion picture film. There was a gain of approximately 50% in the case of silver consumed for other industrial purposes, which resulted to some extent from a more widespread use of new silver alloys for brazing purposes. Research for the development of new alloys and the extension into other fields has continued, and offers some encouragement.

The Silver Purchase Act of 1934 became effective June 19, 1934 and placed a tax on transfers of silver bullion with certain exemptions and abatements for industry. On August 9th the President's Executive Order and Proclamation, followed by Treasury Regulations, required the delivery of silver located in the United States on that date unless withheld under license, and provided exemption for fabricated articles.

The various regulations involved silver-using industries in some details of reporting and extra acounting and under some circumstances, manufacturers found it necessary to deposit silver with the Treasury. However, there has been no curtailment of supplies for industrial use.

The highest New York Official price during 1934 was 55¾c. on Nov. 13th, the lowest 41¾c. on May 1st, and the average for the year 49.973c.

Platinum, Palladium, Rhodium

By CHARLES ENGELHARD

President, Baker & Company, Newark, N. J.

THE year 1934 was a satisfactory year as far as the platinum business was concerned, and the chief reason for this healthy development was that platinum was available at moderate prices, and in the neighborhood of the ruling gold prices. As long as platinum can stay in this neighborhood, I believe the industries will be interested, and platinum will continue as an active competitor to gold.

The proportion of platinum used in jewelry is still below normal, but it will, no doubt, take its old place in this industry with the return of prosperity.

As far as palladium is concerned, this metal shows great attraction for specific purposes—particularly in the dental industry. Its consumption is steadily increasing, and the market for palladium is growing stronger every day.

Regarding rhodium plating, we are only at the beginning, and its prospects are very good.

Secondary Metals

By
T. A. WRIGHT

Technical Director, Lucius Pitkin, Inc., New York

THE year 1934 was a satisfactory year as far as the production of secondary metals has been relatively small. Wider application of stainless steel has made some inroads and the increase in production in zinc base die castings has still further limited the field of some of the other metals and thus also served to lessen production of scrap.

Copper, as usual, has held the center of the stage from the economic viewpoint. Volume has been much less due to restrictions of the Copper Code. The primary producers as a whole have come to take a much saner view since essentially the price of primary is vitally affected by the amount of secondary hanging over the market and copper today being far more dependent upon the durable goods industry than foreign outlets. The Raritan Copper Works has, until recently, been handling only the better grades of scrap, but facilities have been installed for the treatment of smelting grades.

In the country at large an unusually high ratio of foundry ashes, skimmings and similar low grade material has been accumulated due to the fact that 15 to 20% of copper content is the minimum that can be economically handled considering tolls and the distance of the producer from the smelter. While no information has been released for publication, it is understood that considerable improvement has been made in the handling of radiators, the crude solder as recovered being less contaminated.

A very definite and important trend has been the tendency for the secondary smelters to depend upon more and more metallurgical and analytical control. This is true also of some of the larger dealers who find that the increasing complexity of alloys requires more than buying and selling ability. This more definite control of products has been partly the result of close buying, the practice of the day; partly the greater appreciation of the role of specifications, and partly of the role of impurities.

White metals too show considerably less volume.

Battery lead has been handled on a very close margin. The tendency is still towards thinner plates with a consequently lower metallic yield. This is the reflection of the demand for cheaper batteries and the tendency to patch up old ones before discarding. As the year closed battery lead was being accumulated. Competition has been keener than usual, although there is probably no higher proportion going abroad this year than last. The Government statistics will show this later on. No startling technical developments have been released. Japan has been a large buyer of detinning scrap, possibly 30,000 tons out of an estimated production of 150,000 to 175,000 tons going to that outlet. The competition thus set up has been the cause of considerable Congressional study.

Secondary aluminum output has shown a marked falling off in the Fall, but few complaints had been heard among the up-to-date smelters prior to that time. Use of the improved methods of analysis for secondary aluminum, developed under the auspices of the Aluminum Research Institute several years ago, is showing a definite return in improved products and even fewer complaints, as customers have also been furnished with copies of the methods to use.

The export demand for scrap nickel, presumably for war materials, has been very high, although prices have been reduced in the last quarter. Supply has not been up to demand, due again to slowness in the durable goods industry. Monel and nickel-silver have been somewhat of a drug on the market, but any and all types of high nickel, particularly the iron-nickel alloys, free of chromium and copper, found a ready sale.

Little is to be said for zinc except that zinc die castings will probably now begin to come back on the market in larger volume as obsolescent machinery and apparatus is scrapped.

The Brass Rolling Mill

By W. J. PETTIS
Associate Editor

THE passing of 1934 has left little of interest to record, in the way of new installations, or mechanical improvements in the brass rolling mills. Refinements of practice are always being developed.

The big thing is the expansion of copper and brass tube making facilities. Most of the mills are putting in more equipment. The Schloemann extrusion press is now installed at Rome, Waterbury, and Bayway; this is the famous German extrusion machine. A new method of tube reduction is getting well under way at Rome and Waterbury, which will do away with much draw bench work and annealing.

While the rolling mills have made some changes in their physical equipment, revolutionary changes are in the making in the heat treating of flat metal. The past year has witnessed the introduction of a new type of annealing furnace, radically changed in form, and with high efficiency in heat treating that insures uniformity of temper or grain growth in the metal treated. Sheets are passed through the furnace singly, and strip metal is fed into one end of the furnace from the coil, and coiled up on a block as it emerges from the front of the furnace. This insures, not only a uniform application of heat, but also perfect control of the time each sheet or strip is exposed to the applied heat, an all important item.

This accurate control was impossible with the long established "pan" anneal method in which the metal to be annealed was loaded on iron pans approximately five feet wide by twelve feet long, carrying from two thousand to five thousand pounds of metal, depending on the class of work. With pyrometer control and skilled operators these furnaces did a first rate job that met most commercial demands, but did not admit of the mechanically perfect control that the newer type makes possible.

The Brass Foundry

By
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A REVIEW of progress in any industry may be considered from two somewhat differing points of view. One is concerned with the volume of business experienced and the profit enjoyed, the other more particularly with the technical and economic progress which makes up part of the foundation upon which future volume and profits can be built. When one branch of industry is in competition with others, the relationship between these two factors sometimes results in the familiar "vicious circle."

If, over a prolonged period of time, the volume of business is small and profits unsatisfactory, technical progress tends to slow down because of the expense involved. As technical progress slows down, the industry loses ground in its struggle for profitable business, profits continue to diminish and less and less money is available for the support of development work. As this process goes on the industry itself tends to become obsolete, retaining only such portion of its production as cannot profitably be absorbed by the industries competing with it.

This tendency is clearly discernible in the present status of brass sand castings, which have lost much ground to die castings, forgings, stampings, iron castings and articles made from moulded plastics. The year 1934 has witnessed a continuation of this trend which has been noted in previous reviews.

Some progress has been made in the metallurgical study of brass foundry problems. Recent technical meetings have thrown new light on the influence of gases and other dissolved impurities in the production of defective brass and bronze castings. Much difference of opinion still exists as to the relative importance of these factors and the mechanism of their influence but there has been real accomplishment of a helpful nature and further work is actively under way. The detrimental effect of hydrogen has been well established and the consequent importance of eliminating water, as well as other hydrogen-carrying substances, from brass furnace charges is now clear.

Aside from the metallurgical work noted above there is practically nothing new to report. Previous technical advances having to do with sand treatment, temperature control, melting practice and the use of refractories have found only a limited application among brass foundries as a whole. A proportion of the industry has adopted these improvements and has continued to make profitable use of them but their use has not been extended to any great extent during the past year. The unavoidable development and equipment expense involved has undoubtedly been a deterrent factor in this lack of progress. For one reason or another, other branches of the foundry industry have derived more benefit from technical work sponsored or published by the American Foundrymen's Association and other representative agencies.

There has been little increase in the adoption of electric melting, although well-established and properly-managed electric furnace installations have continued to operate successfully in spite of the irregular character and diminished volume of production schedules. The foundry's newest melting tool, the brass-melting cupola, has definitely found its place in the melting of alloys low in zinc and lead and in cases where the cheapness of melting is more important than the accuracy of control. In some instances the crucible has regained lost ground because of its adaptability to intermittent operation and low levels of production.

The completion of one set of exposure tests, the formulation of tentative standard specifications for plated finishes on steel, the support of a second exposure study on a wide variety of plated base metals and improved methods of testing or measuring the thickness of protective coatings, all indicate that the day of scientific plating has arrived. "Rule of thumb" methods can no longer serve.

Added evidence of the importance of the base metal for plated objects has accumulated at an astonishing rate. Eleven years ago the first concrete evidence of the influence of the base metal upon the structure of the deposit appeared in the literature. Today the composition as well as the mechanical treatment of steel is known greatly to influence the quality of plate. Within the last year data upon the effect of aging and of impurities on the behavior of die cast metal, as well as studies upon the diffusion of deposits into the base metal, have not only shown the importance of choosing the right alloy base, but have indicated methods of improving the service life or quality of such products.

Bright nickel plating has improved from processes giving bright finishes upon thinly plated objects to successful rapid deposition of .0005 inch without the necessity of a subsequent buffing or coloring prior to chromium plating. Along with this development improved nickel baths for plating die castings have been recommended. Further progress along these lines is anticipated.

Electrolytic pickling of steel is being extended in its applications and many of the difficulties in processing the alloy steels have been overcome.

Electrogalvanizing has made rapid progress. The electrowinning of zinc from its ores by applying it directly to steel at high current density has challenged the older methods of deposition. It has been possible to meet this challenge by plating from acid zinc baths at high current densities, using aluminum-mercury-zinc anodes.

The electrodeposition of aluminum from non-aqueous electrolytes, the plating of indium from cyanide baths and the deposition of rhenium and tungsten are a few of the recent developments that may promise much in the near future.

Metal Plating and Finishing

By

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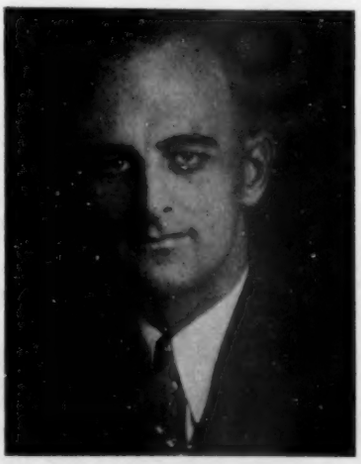

HOMO-POLAR generator design and the application of improved automatic equipment to pickling and plating problems in the sheet, strip, and wire industries mark conspicuous advances during the past year. Many of these features, however, may not be as widely known at present as the progress being made in other directions.

Jewelry Making

By

C. M. HOKE

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WORLD-WIDE interest in the monetary aspects of gold and silver has brought a factitious activity to the jewelry stores of the land. This has shown itself in the feverish sale of old gold and silver, and in some cases in speculation based on the pros-

pects of further rises in these precious metal prices.

The practical advantage of all this was to bring into the jewelry shop a welcome hoard of old customers, most of whom came to sell, but some of whom remained to buy. Federal regulations curbing the fly-by-night buyer have been a great protection to the legitimate dealer.

The influx of old yellow gold has already begun to slacken, in spite of the fact that the supply is far from exhausted. It is apparent that this will soon be followed by a stream of old white gold articles, partly because some of the early white gold jobs were lacking in beauty, partly because white gold is losing its vogue, and partly because the general public, having learned how to go about selling old precious metals, will continue to enjoy the benefits accruing.

For there is no doubt about the return of yellow gold to fashion, with the florid and massive designs that become it. This is seen not only in goods of medium price, but also in novelties and in stone-set goods of highest artistic merit.

Trade conditions within the industry have naturally been affected by the NRA codes and their concommitants. Probably these have occupied the pages of the trade papers even more than their regular standbys—fashions and hold-ups. Certain of the old trade abuses of the industry bid fair to be lessened if not wiped out; we refer to irregularities in the wholesaler-retailer relationship, and in the terminology describing such things as rolled gold, synthetic gems, and so on. The drive to bring about uniformity of terminology from the first step of manufacture to the sale to the ultimate consumer will bring everlasting benefit to the higher type of jeweler.

A natural sequence is a greater interest in the scientific side of our industry, as shown by jewelers studying and reading books on gems, metals, and the theory of design.

Designs tend toward the massive. In some cases this tendency is relieved by flexible joints, skilfully concealed and of intricate workmanship. Clips maintain their popularity, and are found in a wide variety of designs and materials.

New materials of the type known as plastics or phenol resins, are popular in novelty lines; they show pleasing colors, are readily carved, and are not too heavy for massive designs.

Silver, like yellow gold, has increased in vogue; rhodium plate is often used in the effort to make it non-tarnishing.

Re-Tinning Cans and Pans

By WALLACE IMHOFF

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THE hot dip tinning of milk cans and cake pans would normally come under two distinct fields of hot tinning. For example, the tinning of kitchenware, hotel kitchenware, dish pans and cake pans, etc., is in one field; the other field consists of those plants that make a specialty of hot dip tinning milk cans and ice cream freezers, and similar work.

The miscellaneous or jobbing hot dip tinning shop is not as elaborate as these separate fields just mentioned, and the quality of the work is not so high either, since many of the articles are work that is retinned.

In order to produce a first class job, the milk can should be taken apart and all of its pieces repaired and straightened. So far as the writer knows there is no one machine that is used for repairing damaged milk cans; they have to be taken apart and the separate parts either repaired or replaced. Small articles cannot of course, be taken apart but must be repaired by hand.

The hot-dip tinning process consists of first passing the cans through a hot solution of alkaline cleaning compound. This solution is usually kept at about the boiling point, 180° to 200° F. The next step is rinsing thoroughly in a clean hot water tank to eliminate the effects of the alkali. After the cans have been thoroughly cleaned and rinsed, they are ready to be pickled to remove any rust that has formed on places where the tin has either worn off, or been broken off. This solution is usually a 1 to 1 solution of muriatic acid. If the rust is light the solution is used cold; if hard to remove the acid may be warmed slightly until there is enough action to remove the rust entirely. When the cans have been thoroughly pickled and all rust and foreign matter of every kind removed, exposing the clean bare surface of the steel where the rust was, the cans are then ready for the tin bath.

For very high quality work there are at least 2 tin pots required, and for highest quality work three are used. The work when done by passing just through one tin pot usually has a heavy yellow oxidation product over it. In some cases to avoid this a large number of cans are put through the bath at one temperature, from 550° to 600° F., and then after they are all done the tin bath is cleaned, a new flux put on it, and the bath temperature lowered to about 500° or 520° F., and the cans redipped and finished. However, it must be realized that even with this precaution the quality will not be as high as when a separate roughing tin pot is used and a finish given in what is known as a finishing tin pot. In some plants a third bath of very high quality tin is used as a final dip to give the highest quality finish and lustre.

After coming from the final tin bath, the cans are either carefully scraped and then dipped in a barrel of high grade fuel oil or red engine oil to set the coating and prevent discoloration of the coating from oxidation. The cans are then passed through cedar sawdust, whiting, and then through pine sawdust after which they are polished with soft rags.

The same general process can be used for the cake pans. A few trials will show the exact temperature of the tin bath that will give the lightest coating and brightest finish.

Advanced Practice in the Rolling of Brass

A RECENT issue of United Effort describes in detail the use of a 4-high roller bearing mill made by the United Engineering and Foundry Company, Pittsburgh, Pa., in connection with a new method of cold rolling strip metal, together with the machinery incidental thereto as developed by J. R. Coe, the Mechanical Superintendent of the American Brass Company, for their New Toronto, Canada, plant.

Mr. Coe has given the following description of his methods.

The mills installed for use with Mr. Coe's methods of handling are designed for the rolling of much heavier bars than have heretofore been used in the brass mills of America and the special equipment described in the following article makes it possible for a small plant to use a single stand 4-high mill and produce material with practically the same advantages as those enjoyed by larger plants with tandem mills.

Flat bars 18½" wide, ⅜" thick, 18 to 24 feet long are delivered in piles to an elevator in front of the 14" and 32"x48" 4-high mill shown in Fig. 1, and successively entered into the rolls by a reciprocating pneumatic pusher which, resting on the top bar, engages the back end of this bar when lifted by the elevator to a position slightly above a guide table in front of the rolls.

Passing through the rolls, the bars are coiled by a 3-roll coiler from which a pneumatic ejector pushes them on to a conveyor extending back into the mill a sufficient distance to provide storage room for 25 coils. At the rear end of this conveyor they are transferred sideways through a coil opening machine where an operator first clamps the bars against rotation and then pulls back the tail end and irons it down and

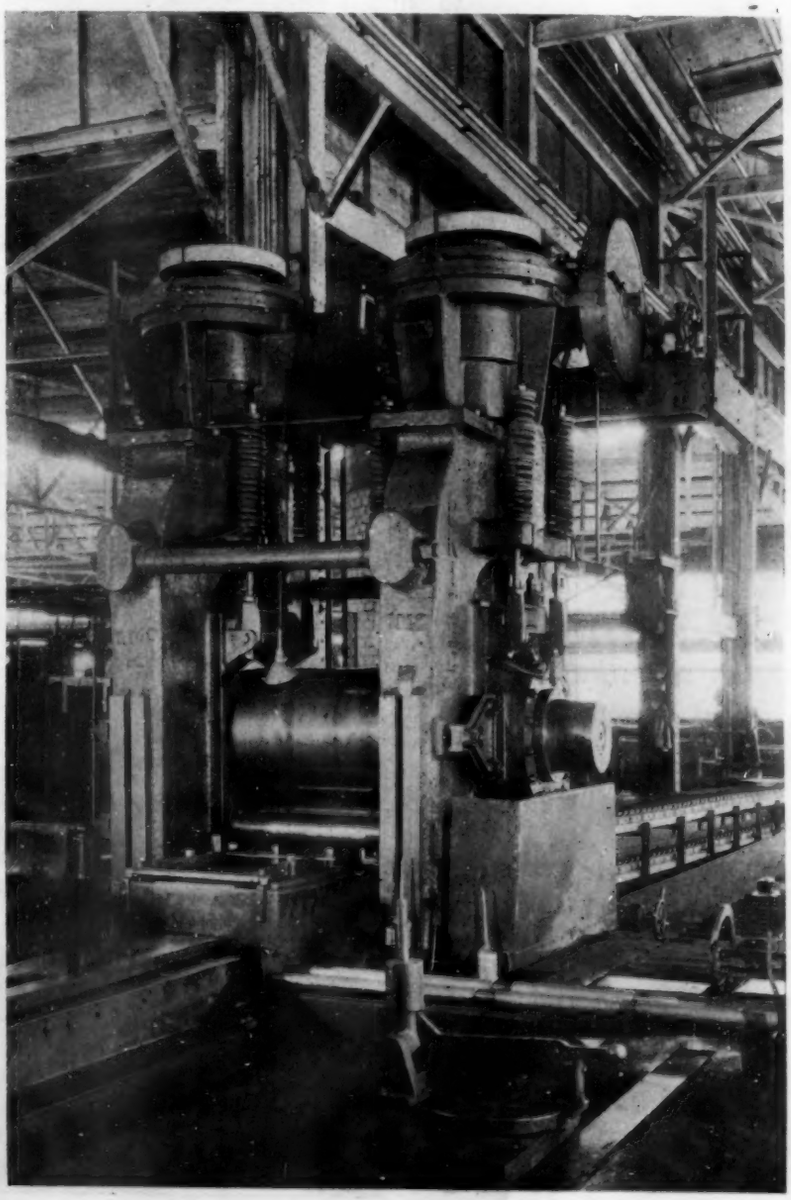

FIG. 1. 14 AND 32 x 48" —4-HIGH MILL

over a removable wooden form of such shape that when released this end projects tangentially from the coil for distance of about 3 feet.

Returning to the front of the mill on a second conveyor, the coils are again transferred sideways to a coil sticking machine consisting of two carriages, one of which carries a bass covered wooden peg while the second carries a horn and a short guide table.

When these carriages are drawn back from the rolls by a pneumatic cylinder a space is provided through which the upstanding end passes when the coil is pushed on to the horn. This tail end is turned down into horizontal position between the guides by forward motion of the peg and then entered into the rolls by further forward motion of the two carriages with the peg sliding under an idle roller mounted between the housings to prevent uplift of the peg and cause it to firmly grip and position the bar.

After a batch of approximately fifty bars has been passed through the mill and stored on the conveyors, the rolls are adjusted for a second pass and the entire batch is again passed through the mill,—this operation being repeated until any desired reduction has been made, or, until it is no longer practical to coil the metal and it becomes necessary to wind it on a drum or spool.

Metal less than .055" thick but still 18½" wide is rolled on a 8½"x24"x26" 4-high mill equipped with conveyors similar to those described above, but the metal delivered to this mill in coils from the large 4-high mill is wound onto and stored on large flanged spools to protect surface and edge.

The front end of each bar leaving the rolls is wrapped around the spool by two swinging arms so geared together as to simultaneously encircle the spool when closed or completely clear it when open and provide room for a motor operated car to move forward under the spool when a hook carried by a car engages the spool and backward movement of the car draws the spool off the winding drum, carries it back to a position in front of one of the conveyors and then tilts to discharge the spool onto this conveyor.

At the rear end of the conveyor long enough to provide storage for 25 spools the metal is transferred sideways to a second conveyor by an operator who trims off any ragged ends and unwinds the metal from the spools after it has passed through the rolls for the last time.

Returning to the rolls on a second conveyor, the loaded spools are transferred sideways to a position directly in front of the rolls, the metal is passed again through the rolls and the empty spool returned sideways to the second conveyor for delivery to the transfer car back of the rolls by which it is placed on the winding drum for further loading.

The large 4-high mill driven by a 750 H.P. motor

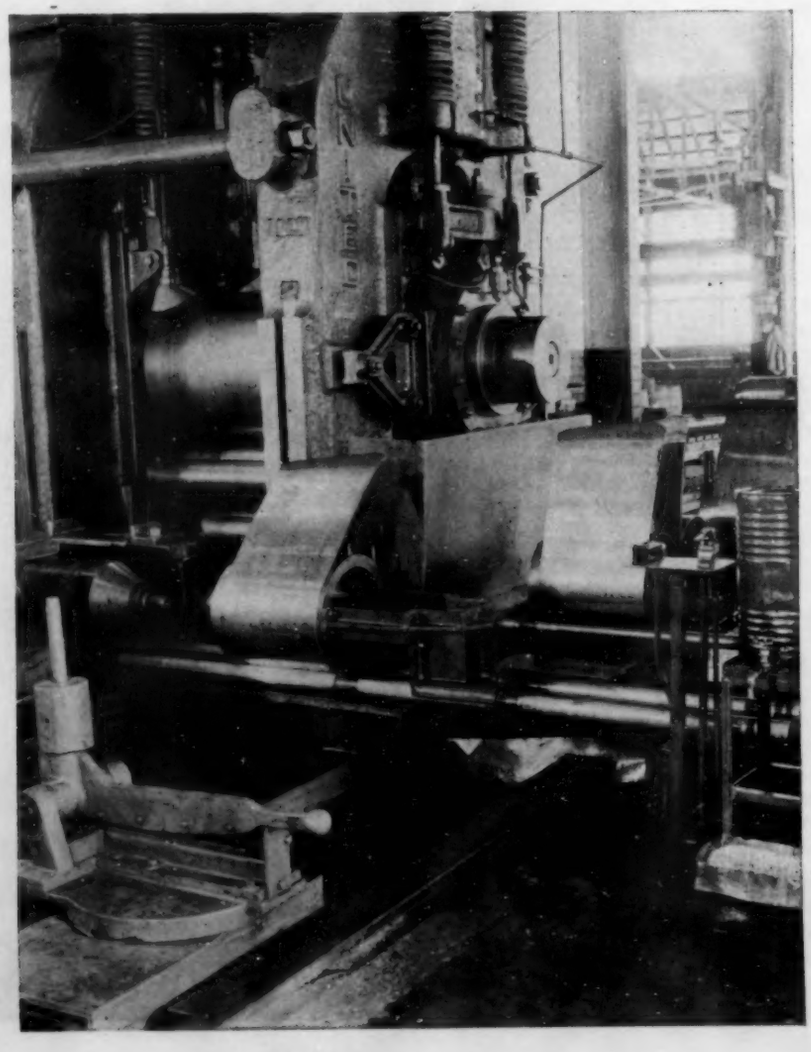

FIG. 2. COIL STACKING MACHINE AND BOBBIN

operates at a constant speed of 200 ft. per minute while the small mill driven by a 300 H.P. variable speed motor operates at any desired speed between 0 and 700 ft. a minute, and the productive capacity of these two mills is quite remarkable as the bars follow each other with amazing rapidity and roll adjustments are only made after a batch of fifty bars has passed through the mill.

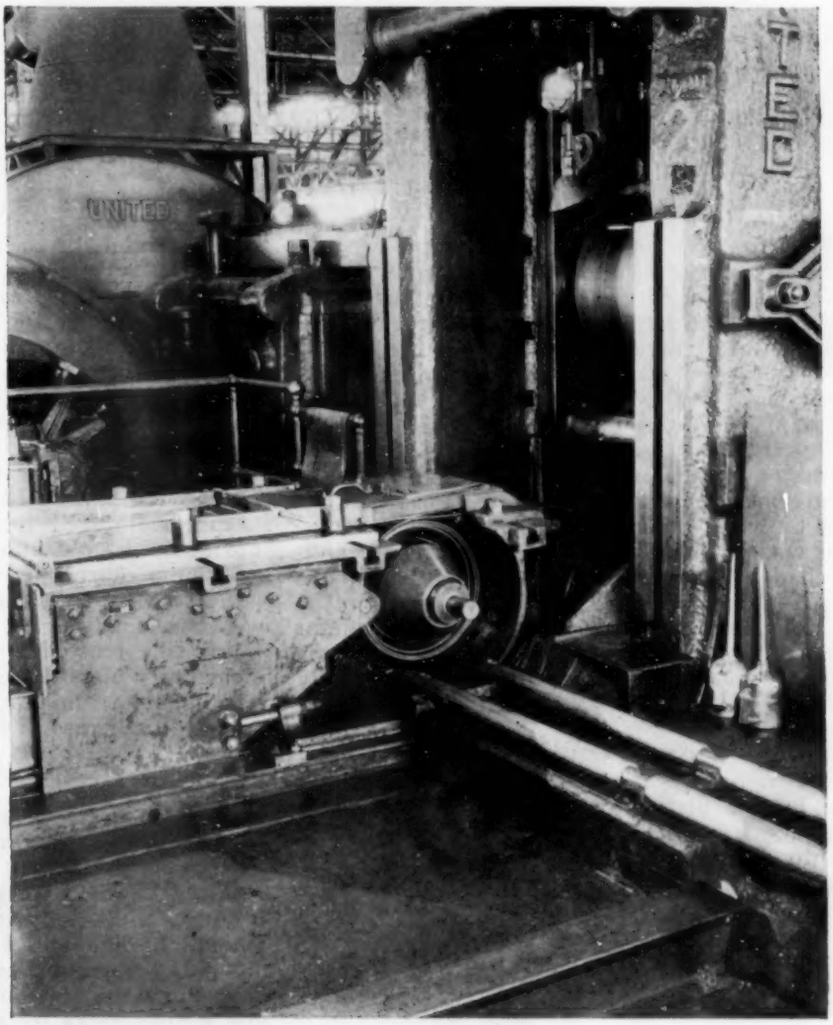

FIG. 3. COIL BEING ENTERED FOR SECOND PASS

Melting Furnace for Zinc

Q.—Can you tell me what is the best type of furnace to use for melting zinc that is to be rolled? We are contemplating going into the manufacture of zinc caps and are wondering what the best type of furnace would be.

A.—The slab zinc used for rolling is partly refined in a reverberatory furnace with inclined hearth. Any surplus lead in the zinc collects in the lower portion of the furnace and above this is found the iron and zinc alloy. A small amount of iron and cadmium in the metal could have no injurious influence on the rolls.

After refining, the zinc is cast in molds of varying capacity according to the gauge and size of the sheet to be obtained. The mold rests on water cooled revolving table As soon as the slabs are set they are picked up and transferred to a traveling table or elevator moving in a closed chamber in order that the slabs may be cooled to a uniform temperature, usually 320 deg. F. At this temperature zinc has the greatest malleability.

For the production of sheet, the slabs are sent from the cooling chamber to the breaking down or roughing rolls. From these rolls they go to the roughing shears to be cut to size, allowing for the removal of the rough edges, and so on until finished.

If, however, you want only a small tonnage of rolled zinc, an iron pot furnace can be used or better still, a tilting crucible furnace. A number 225 furnace will hold about 500 pounds of zinc and is known to run as high as 175 heats with one crucible. You will find this style furnace advertised in **Metal Industry**, and possibly it will meet your requirements.—**W. J. Reardon.**

Losses From Recovery Rinse Tanks

JOSEPH B. KUSHNER
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A Scientific Analysis of an Important Plating Shop Problem, The Prevention of Precious Metal Losses

MANY electroplaters working with the precious metals, make use of what is known as a "metal recovery rinse tank." The purpose of this tank is, as the name suggests, the recovery of the valuable metal in the electrolyte of the plating bath that is carried away by clinging to electrodeposited articles. Yet few of these platers realize that under certain conditions the recovery rinse tank, instead of performing its useful function, assumes a diametrically opposite characteristic and actually wastes, precious metal! Indeed, at such times the tank may be well termed a "metal losing rinse tank."

Under what circumstances does such an antithetical change occur? What factors influence this change? How can such a change be prevented? The answers to these questions and others of similar nature can only be obtained by an analysis of the theory of the recovery rinse tank; a theory sadly neglected in plating literature. Such an analysis is given here.

The recovery rinse tank consists usually of a crock of about 5 to 15 liters capacity, filled with water, standing close by the plating bath. Work, immediately upon issuance from the electrodepositing solution is dipped into it, whereupon the concentrated electrolyte dripping from the rack is greatly diluted by the fresh water. The rack is now withdrawn and is generally rinsed in running tap water preparatory to whatever finishing operations may follow.

After a period of time the contents of the crock are emptied into a barrel and taken away to the refiner's where the precious metal is extracted. Sometimes, instead of this procedure the plater uses the contents to replenish old or make up new plating solutions. In this manner considerable amounts of gold, rhodium, platinum or palladium are saved and returned to the bath. This, in a nutshell is a description of the recovery rinse tank and its use.

From what has just been said it is not difficult to see that there must be a loss, no matter how small, from the crock to the drain, for in removing the rack from the crock we take away with it part of the now enormously diluted electrolyte we originally carried in. On the face of it, it would seem that this loss must be very minute in view of the vast difference between the volume of the rinse water and the volume of the drippage, yet strange as it seems, it can be proved as the writer does below, that, if the crock contents are not emptied often enough and renewed with fresh water, the recovery rinse tank becomes worse than useless as it merely constitutes a needless intermediate step in the transfer of the plating bath to the drain! To put it directly and bluntly, **it wastes money.**

Why? Because it must not be forgotten that the metal content of the crock is constantly being built up. Every rack that is rinsed adds to the amount of metal already present. In effect you are emptying the rinse tank of the fresh water it initially contained and refilling it with plating solution of the same concentration as that of the bath. It is indeed surprising how soon the point is reached where the crock contains almost pure electrolyte. From that point on you are no longer emptying the crock of fresh water but are instead taking the plating solution to the sink! This is the antithetical change of nature mentioned in the opening paragraph and it obviously occurs with the arrival of the crock at its maximum capacity for holding metal—which capacity is determined by what?

Let us analyse the theory of the rinse tank. To follow the reasoning involves only a knowledge of elementary algebra but those platers who find x and y a bugaboo can proceed at once to the derived results, to make use of them as they see fit.

Theory

In order to arrive at a rational and simple theory, three things are assumed:

1. The size, shape and surface conditions of the rack. (We shall refer to the rack in the sense that it means rack and work together). Determine the amount of liquid it will retain (drippage) when removed from a tank holding said liquid. This is an approximately constant quantity for a given rack and similar racks retain similar quantities.
2. Where racks are not alike. (This is generally not the case in production shops, where on the whole, objects of the same type are plated). It is possible to use an average value for the drippage.
3. The concentration of metal in the plating tank is kept constant. (This is usually true, as the solution is continually replenished by fresh additions of metal to keep the color and plating time up to standard).

In this derivation the gram (gm) and the cubic centimeter (cc) are used exclusively, but any consistent set of units such as the gallon and the ounce may be used equally well.

Symbols

Let V = The volume of the recovery rinse water in cubic centimeters.

Let d = The volume of the average drippage from one rack in cc's.

Let g = The concentration of metal in the electrolyte in grams/cc.

Let n = The number of rinses made over a given period of time.

Let T = The grams of metal removed from the plating bath during n rinses.

Let R = The grams of metal remaining in the crock after n rinses.

Let L = The grams of metal lost down the drain during the same period.

Derivation

We know that at any time, the grams of metal removed from the plating bath must be equal to the sum of the grams of metal in the crock and the grams of metal lost down the drain. Or:

(1) $T = R + L$

and (2) $L = T - R$ by rearrangement.

Every time we remove a rack from the plating bath we carry away d cc's, of electrolyte, each cc holding g grams of metal, or a total of dg grams. Obviously if we plate n racks and remove them from the bath we take away as a total, ndg grams of metal. So:

(3) $L = ndg - R$

It now remains to determine R in order to evaluate L.

Consider the rinse tank shown in the diagram. It is filled with fresh water to a volume V.

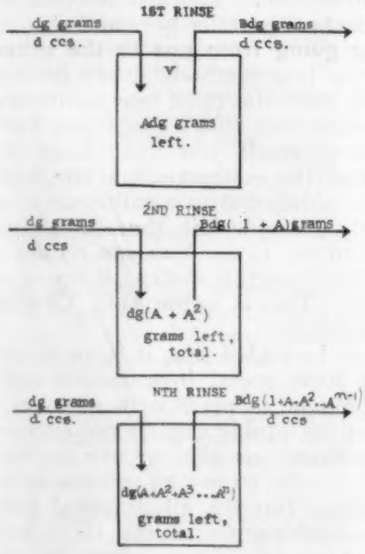


Diagram of Rinse Tank Operations

At the first rinse we bring in d cc's of electrolyte and each cc holds g grams of metal. Therefore the crock now holds dg grams of metal. But this amount of metal is distributed over (V + d) cc's, (we have added d cc's), and hence in every cc of the crock we have:

$$\frac{dg}{V+d} \text{ grams of metal.}$$

In removing the rack from the crock we take away d cc's, leaving in the crock the original volume V we started with. It then follows that the crock now holds:

$$\frac{Vdg}{V+d} \text{ grams of metal and}$$

we have taken away to the drain

$$\frac{d.dg}{V+d} \text{ grams of metal.}$$

Let $\frac{V}{V+d} = A$ and $\frac{d}{V+d} = B$; and $A + B = 1$.

After the first rinse, therefore, there remains in the crock Adg grams of metal and Bdg grams have been lost.

1st rinse: $R = Adg$

Now on the second rinse we add dg grams to the total in the tank and we now have, dg + Adg grams in the crock. In removing the rack, however, we take away the Bth part of this amount, leaving the Ath part, or: (dg + Adg)A.

Multiplying through and extracting dg:

2nd rinse: $R = dg\ (A + A^2)$

Similarly after the third rinse:

3rd rinse: $R = dg\ (A + A^2 + A^3)$ and by induction, the total remaining in the tank after n rinses is:

Nth rinse: $R = dg\ (A + A^2 + A^3 + A^4 \ldots + A^n)$ grams.

The series in the parentheses is easily recognized as a geometric series, the sum to n terms given by any algebra text as:

$$\frac{A\ (1 - A^n)}{1 - A}$$

Substituting the fractional value of A wherever it occurs outside the parentheses the expression for the sum of this series simplifies to:

$$\frac{V\ (1 - A^n)}{d}$$

Therefore the amount remaining in the tank after n rinses is given by:

$$(4) \quad R = dg.\ \frac{V\ (1 - A^n)}{d} = gV\ (1 - A^n)$$

We can now evaluate L as:

$$(5) \quad L = ndg - gV\ (1 - A^n)$$

Since A is a fraction, namely, $\frac{V}{V+d}$, as n increases in value, $\left(\frac{V}{V+d}\right)^n$ becomes very small*, so small in fact as to become negligible when compared with unity and so:

$$(5) \quad L = ndg - gV\ (1 - A^n)$$

simplifies to:

$$(6) \quad L = ndg - gV = g\ (nd - V)$$

Results

We have just shown that after a large number of rinses the total amount of metal lost down the drain is given by the concentration of the metal in the plating bath into the product of the drip and the number of rinses minus the volume of the crock water. Stated symbolically:

$$L = g\ (nd - V) \text{ grams.}$$

This is the expression we sought and will enable us to prove the statements made in the beginning.

Examination of this expression as it stands shows at once that if the rinse water is not changed often enough all the metal taken out of the bath goes down the sink. For V is a fixed quantity whereas n is constantly increasing and as soon as it becomes sufficiently great, V becomes negligible to the product nd and all the metal is lost.

At this point a practical illustration of the use of this formula will clear up any doubts or misapprehensions.

*This depends on the ratio of d to V and when n is not great the last factor must be considered. In another article the author will deal with such cases and present a method for determining the loss and n, from an analysis of the rinse water.

Problem

A certain gold plating plant invariably found, upon taking a quarterly gold inventory, a metal deficit that could not be ascribed to any particular source. They had three tanks in which the concentration of gold was 1 gram per liter (1000 ccs.). Each tank held six racks and was run about 20 times a day. By actual test the average drippage from each rack during production was 10 cc's. As a recovery rinse they used a crock of 8 liter capacity mounted on a mobile base so that it could be wheeled alongside of any bath from which work was issuing. The crock was emptied and refilled with fresh water once a month.

Question: Could the deficit be due to recovery rinse tank losses?

Answer: We have all the factors to the solution of equation five.

This should give the answer.

n** = 3x6x20x20 (working days in a month) = 7200

d = 10 ccs.

V = 8000 ccs.

g = 1 gram per liter = .001 gram per cc.

∴ L = .001 (7200x10 — 8000) = 64 grams!

Over a period of 3 months this amounts to 3 x 64 = 192 grams of gold, which at present prices is a tidy little sum.

Another illustration in English units:

A rhodium plater had a tank in which the concentration of metal was ¼ oz. per gallon of solution. He flashed objects in it on the average of 200 times a day and the average drippage by actual test was found to be 0.001 gal. His recovery crock held 1 gal. of fresh water and was renewed once every ten days.

Question: How much rhodium did he lose a month?

Answer: The solution of the formula gives the answer.

n = 200x10 = 2000

d = .001 gal.

V = 1 gallon

g = ¼ oz./gal.

L = ¼ (2000x.001 — 1) = ¼ ounce and for a month the loss is ½ oz. of rhodium.

Preventing Losses

Now we can consider ways and means to prevent such losses or reduce them to a minimum.

The expression is influenced by four factors, n, d, V and g. Examination shows that if we decrease n, d, g or increase V we automatically decrease the loss. Which shall we do? We will compare the four methods on a percentage basis by taking actual examples.

1. **We can decrease g** (the metal concentration). This is probably the least feasible of the methods available as the concentration of metal in the bath must be maintained at a certain minimum amount in order that the best work be done. Since this factor occurs outside of the parentheses in the formula, a decrease of g by ½ will result in a decrease of the loss by ½, or 50%.

2. **We can make n smaller by changing the crock water more often.** Suppose in the first illustration we cut the value of n in half by changing the water every 10 days instead of twenty; then: L = .001 (3600 x 10 — 8000) = 28 grams and for a month the loss is 56 grams, a saving of 12.5%.

Suppose the crock were changed every week; then: L = .001 (1800x10 — 8000) = 10 grams and for a month the loss is 40 grams, a saving of 37.5%!

It is important to change the crock water as often as possible and compatible with refining and storage costs.

3. **We can make d smaller** by holding the work over the plating tank and crock until almost all the drippage has drained off. This is the least difficult thing to effect, even though it necessarily means a loss of time. In the first example let us reduce d by ½ and compare.

L = .001 (7200x5 — 8000) = 28 grams. A saving of 56%!

It is important to keep d a minimum by careful draining.

4. **We can increase the size of V by increasing the volume of the crock or else use 2 crocks in series where one was used before.** (This method is more than equivalent to doubling the original size of the crock as can be proven mathematically. However, the proof is too long and involved to be given here).

Let us double the size of the crock in the first example. L = .001 (7200x10 — 16000) = 56 grams, a saving of 12.5%. Again it must be stated the use of two crocks of similar size produces a much greater comparative decrease in losses than a single crock double the size of either one. The use of two recovery rinse tanks is the best practice here and abroad.

Use two rinse tanks going from one to the other.

The comparison of the four methods shows us that the last three are good, with the third one mentioned the best. However, remember this. Once you have purchased your recovery crock you haxe fixed V; once you have decreased the concentration you have fixed g; once you have reduced d to a minimum you have fixed d. The only variable left, therefore, after the conditions have been set, is n. You can reduce n as much as you want by changing the crock water as frequently as you wish. **This is important. Change the crock water often.**

In conclusion, it must be stated that it is an actual impossibility to avoid some metal loss, as the only way for doing this would be to plate with racks and metals that are not wet by liquids and do not entrain electrolyte on their surfaces; or else to use a rinse tank of infinite size (!) or else to use an infinite number of small rinse tanks! But for all practical purposes, if we follow a combination of the ideas and precautions outlined above, the losses may be reduced to a negligible minimum.

**Had the racks been dipped 6 at a time n would have been diminished by 6 but d would have been increased by 6, thus leaving the product nd exactly the same value as it had before.

A Tale of a Crime

By HEDLEY RICHARDS

An oxidized sample was furnished a Plater,
T'was bought in old Venice so said the relater.
He wanted a grille made to just imitate'er
He wanted the very same shade.
But the sample was small and the job weighed a ton
It was surely a job any Plater would shun,
And he knew he'd have trouble before he begun,
Though similar work he had made.

He got the work near it without much delay,
It looked like a match a short distance away,
And we didn't plate goods in those days with a spray,
But he found a way easy as pie.
To refinish the job there was simply no time,
But he got an idea that was truly sublime.
He just changed the sample, t'was truly a crime
And the Plater who done it was I.

A Calendar of Events of Importance to the Metal Industries

1934

JANUARY

Announcement that Research on Protective Value of Electroplated Coatings on Steel, at Bureau of Standards will be discontinued as of February 1, 1934, for lack of funds.

Master Electroplaters' Institute of the United States completes its organization at meeting of Board of Governors in Cleveland, January 19-20.

Silverware Code effective January 2nd.

FEBRUARY

Institute of Metals Division Meeting in New York, February 20-22.

Secondary Aluminum Code effective February 23.

Announcement that Research on Protective Value of Electroplated Coatings on Steel at Bureau of Standards will be continued as funds have been made available.

Aluminum Colors, Inc., patents on aluminum coloring sustained by U. S. District Court, Eastern District of New York.

Industrial activity begins to increase.

MARCH

Group Meeting of Committees of the American Society for Testing Materials in Washington, D. C., March 5-9.

General interest developing in bright nickel solutions.

Death of Frederic B. Stevens, March 1.

General improvement throughout industry.

Die Casting Code effective March 18.

APRIL

Electrochemical Society Meeting in Asheville, N. C., April 26-28.

Copper Code effective April 26.

Industrial activity maintained.

MAY

Job Galvanizing and Metal Coating (Supplementary) Code effective May 26.

Improvement in industry continues.

JUNE

Nickel and Nickel Alloy Code effective June 3.

American Electro-Platers Society Meeting in Detroit, June 11-14.

Report on the Results of the Two-Year Testing Program of the National Bureau of Standards on The Protective Value of Electro Plated Coatings on Steel.

International Fellowship Club Meeting in Detroit, June 11.

Master Electro-Platers Institute holds first Annual Meeting in Detroit, June 9-10.

American Society for Testing Materials Meeting in Atlantic City, June 25-29.

Lead Industries Code effective June 4.

Copper rises to 9c.

National Housing Act signed June 28.

JULY

Federal Government deficit for the fiscal year ending June 30 equals $3,629,000,000.

Death of William H. Bassett, July 21.

Industrial activity recedes.

AUGUST

Silver nationalized by Presidential Order, August 9. All silver to be sold to the Mint at 50.01c. per ounce, except newly-mined American silver, which is continued at 64½c., net.

Continued recession in industrial activity.

Standards of Quality for Flatware approved August 7.

SEPTEMBER

Electro-Platers' Code effective September 1.

Electrochemical Society Meeting in New York, September 27-29.

British Institute of Metals Meeting, September 3-6.

First Annual Meeting of the Non-Ferrous Foundry Association in Chicago, September 19-21.

Conference on Specifications for Electroplated Coatings on Steel, in New York, September 26.

Industrial activity declines to its lowest point since June 1933.

OCTOBER

American Foundrymen's Convention in Philadelphia, October 22-26.

National Metal Week, including Fall Meeting of the Institute of Metals Division, A.I.M.E., in New York, October 1-5.

Industrial activity begins to rise from its low point.

Arnold Lenz awarded Whiting Medal by American Foundrymen's Association.

Silver rises to over 55, ending the month at 51.15.

Aluminum price drops to 22c. per lb. after more than 4 years at 23.30.

NOVEMBER

Dr. F. M. Becket elected Honorary Member of the Electrochemical Society.

Death of Bradford H. Divine, November 24.

Industrial activity continues to rise.

DECEMBER

Non-Ferrous Scrap Trade Code Authority presents Brief before the NRA protesting against methods of purchasing scrap employed by the Custom Copper Smelters.

Industrial operations steady, receding only seasonally.

Retail sales activity very high.

Review of 1934. Prospects for 1935

AT THE end of 1933 we took the risk of counseling our readers to take heart. We ventured the prophecy that the depression had run its course like a disease, and that we were convalescing. The record of 1934 shows that our prophecy was fortunate.

The year began at a rather low point, but almost without interruption, business improved steadily so that at the end of the first six months, industrial operations had climbed to within hailing distance of "normal." It was a good half year. The third quarter followed with as steep a decline as we have witnessed in a decade. The summer was one of the worst in recent years. The fall came and the expected or hoped-for seasonal improvement was late. But for any reason that anyone wishes to attribute it to, or for no reason at all, the fall pick-up finally arrived and has continued steadily, almost without interruption, to the end of the year. The net result has been that 1934 was considerably better than 1933.

To say that it was a good year would be an exaggeration. At best, it could only be called passable. But the fact still remains that it was well above the year which preceded it.

We are divulging no state secrets when we say the road before us is still steep and rocky. We still have about 10,000,000 unemployed. To be sure more than 600 corporations increased their dividends, life insurance sales increased between 9 and 10 per cent, commercial failures fell 42 per cent, factory employment rose 17 per cent and pay rolls increased 33 per cent. Nevertheless, industry is far from profitable as a whole. Employment must go considerably further before we have taken up the huge numbers of men and women still on relief, and our annual national income is much too far below what we should be producing and earning to be called even "fair."

Metal Prices

Metals throughout the year 1934 were on the whole fair to firm in their activities, with some outstanding exceptions. Copper rose very little but that rise was steady, from 8 to 9 cents per lb. Zinc has been rather slack, beginning the year at about 4.35 cents per lb. for Prime Western, seesawing irregularly a little above and below 4 cents a pound and closing at about 3.70. Tin was also rather unsteady to weak, although not markedly so, shifting between 50 and 55 cents per lb. the whole year and ending at about 50.8. Lead was another rather weak actor, starting at 3.90 cents per lb., varying downward rather than upward, and finishing at 3.55.

Aluminum began the year at 23.30, the price at which it had been held for about four years, but in October it dropped to 22 cents per pound, where it now rests. Nickel has been, like the Rock of Gibraltar, immovable. It is still at 35 cents per pound for electrolytic.

Antimony was one of the quiet metals for the first nine or ten months of the year, but in the fall it suddenly awoke with a start and in two months it had climbed from its post at around 7 to 7½ cents to as high as 14 cents per pound.

Silver was, of course, the leading cut-up of the family. It had already been stimulated in 1933 by Government action. The metal was nationalized, setting the price of domestic, newly-mined metal at 64½ cents per ounce net, which raised the open market price to around 44 cents. In August all silver was nationalized by Presidential Order and was required to be sold to the Mint at 50.01 cents per ounce; newly mined American silver continued at 64½ cents. Naturally, silver rose at once to about 50 cents. After lying quietly at that level for a few weeks, it staged another hop, going at one point, to a little over 55 and ending the year at 54.75.

Platinum followed an uninteresting course downward from $38.00 per ounce to $34.00. Gold began the year at $34.45 per ounce, but was set on February first at $35.00 by the U. S. Treasury where it has remained to date.

The prospects for the coming year for metal prices are on the whole, fair. Copper seems to be well in hand. The Blue Eagle metal controlled by the Code Authority of the Copper Industry, has been apportioned by agreement among the producers and the large majority of the important consumers have agreed to use it for the major part of their needs. Since imported copper is no longer an item under the 4 cent per pound tariff, American production can be stepped up as industries' needs require. The zinc situation should improve if for no other reason than that it is very near or at the bottom at this time. Lead is in very much the same position as zinc. Tin production seems to be well controlled and should not be allowed to outstrip consumers' needs. Nickel has been broadening its consumer markets steadily for years, and should suffer no relapse. Antimony seems to be very buoyant at this time but its record in the past proves that it can drop as well as rise. The future of aluminum is hard to guess. Its price is, of course, controlled, but it may be affected by the entrance of a large, well-financed competitor into the field of producing the raw metal. Silver is another metal that can fall as well as rise, but so long as it has the backing of the Government, it should remain at relatively high levels. Platinum finds its industrial situation improved by the rise in the price of gold to its own level, but its future hinges largely on the purchasing power of the luxury-buying public.

Technical Developments

Naturally, with the economic situation as it has been, technical improvements are not pressed with the strength displayed during buoyant years. The brass foundry has been notable for some time for its lack of outstanding progress, although gains have been made in the better understanding of the influence of gases and other absorbed impurities on the production of defective castings. Beryllium copper has gone ahead steadily. Lead has found some new outlets in special alloys, one of the most interesting of which is tellurium lead, containing 0.05 to 0.06 per cent tellurium. Zinc has continued to show improvement and expansion in die castings, in rolled zinc forms with small percentages of metallic addition agents, but mainly in the growing realization of the great value of heavier hot dip coatings. Tin plating has widened its field having been found useful on cast iron automobile pistons, refrigerator coils, etc.

Aluminum continues to keep the spotlight by its increased use in transportation, such as the high speed railroad trains, automobile truck bodies and even "heavy" construction. New alloys have been put forward in nickel, and its uses continue to multiply.

In the brass rolling mill innovations have been few but some of them hold forth extraordinary promise. One is the use of continuous strip annealing furnaces to replace the old hand type operations. Another is the coming "direct" rolling method, whereby the metal from the furnaces is poured in a plastic condition directly into the rolls, eliminating the bar or slab casting operation. Full details of this type of work are not yet available.

The secondary metal industry has been moving steadily in the direction of better operation through more careful analysis and metallurgical control.

The plating industry has been one of the exceptions to the "Rule of Doldrums." Technical development has moved apace. Bright nickel deposits which, it has been repeatedly stated, eliminate the subsequent buffing and polishing operations, have aroused a great deal of interest. Technical control of plating operations is growing steadily. The research on the protective value of electroplated coatings of steel at the National Bureau of Standards by the American Electro-Platers' Society was completed and a new research is under way, into plating on non-ferrous metals. On the basis of the report of this testing program from the Bureau of Standards, tentative specifications are being drawn up for electroplated coatings on steel which will eventually result in standard specifications. This move is another long step toward making electroplating a science rather than an art.

Electrolytic pickling of steel is coming into prominence. Electro-zinc coating has made rapid progress; one outstanding process recovers zinc directly from the ore by leaching and then deposits the metal from this leaching solution directly on steel at extraordinarily high speeds There are hopes also that in the near future we shall be commercially plating aluminum from non-aqueous electrolytes, indium from cyanide baths and also rhenium and tungsten. Rhodium plating is now an accomplished fact, spreading widely.

In the manufacturing field, bright annealing and electric furnace brazing are gaining popularity.

Economic Developments

Attention during the past year has been focused, naturally enough, on the economics of industry rather than technical features. Some of the events during the past year had the elements of great potential, as well as immediate importance to our industries.

The Master Electro-Platers' Institute of the United States, the national trade association of the job plating industry, completed its organization, had a code accepted, and has gone a long distance in the direction of setting up a national enforcement body with regional code committees through which it will work. The Non-Ferrous Foundry Association has been in active operation and has developed a standard cost and estimating system for jobbing foundry work. Other codes which became effective during the year included silverware, copper, job galvanizing, die casting, nickel and nickel alloys and lead. Patents on aluminum coloring were sustained in the Federal District Court. Standard of quality for flatware approved by the N. R. A. under the code of the silverware industry. The National Housing Act has already begun to be felt as a spur to the building and allied industries.

Some of the statistics which have been made available are enlightening. According to a report from the Foundry Equipment Manufacturers Association, this industry experienced a considerable gain in gross sales for the previous year. Among the metal consuming industries, the statistics are also encouraging. Sales of radio sets established a new all-time record, about 5,350,000. Shipments of range boilers have been rising steadily since July; shipments of railroad locomotives also. Incandescent lamp sales in 1934 by the General Electric Company indicate a total of 645,000,000, 4 per cent higher than in 1933 and approximately 2 per cent higher in 1929, the previous high year. Sales of paint, varnish and lacquer products have fluctuated throughout the year, but have been consistently about 10 to 20 per cent above 1933, which was slightly above 1932. The automobile industry was well ahead of its previous year in both passenger cars and trucks; only taxicabs, a small part of the total output, falling behind.

Of course, the most important single feature of the industrial situation in the United States during the past year has been the progress of whatever one may wish to call it, of the N. R. A., under the National Industrial Recovery Act. This arm of the Government set out to revolutionize industry or to allow industry to revolutionize itself by setting up self-governing bodies in each special field, who would "manage" their industries under the supervision of the Government. This plan has resulted in more differences of opinion and has occupied more public attention than almost any other single feature of the past four or five years, and agreement is not yet in sight. At the time of writing a public hearing is being held in Washington to help clarify future price-fixing policies.

Prospects for 1935

Predictions for the future have become notable for their scarcity among reliably informed authorities. However, there are some statements which can be considered, bearing in mind, however, that they are subject to bias depending upon the special situation of the individuals who make them.

Secretary of Commerce Roper, predicts "Clearing with fairer weather ahead." Automobile manufacturer Henry Ford believes that 1935 will be much better for business and for the whole country than was the year just ended. Gerard Swope, president of the General Electric Company, looks forward to continued improvement in business in 1935. John W. O'Leary, president of the Machinery and Allied Products Institute, says that the expenditures of tens of billions of dollars for new machinery by the durable goods industry, and resulting re-employment of about 4,500,000 workers await only the restoration of business confidence and credit. Sales of the Western Electric Company for 1934 were about $90,000,000 compared with $69,500,000 in 1933, and further improvement is anticipated in 1935.

The metal industries, as we have stated many times, are largely of secondary character. Their prosperity depends upon the prosperity of the industries to which they sell. We depend almost entirely upon general business conditions. It is the opinion of **Metal Industry** that the coming year has the possibilities of showing continued improvement unless interfered with by (1) business men's loss of confidence in the Administration, (2) direct currency inflation, (3) possible catastrophes abroad which will be felt here.

The most pressing problem of the non-ferrous metal and metal products manufacturing industries, is the revival of durable goods manufacturing. This field is as never before, dependent upon the wisdom and self-control exercised by the Government.

Correspondence and Discussion

Nickel Analysis Calculation

To the Editor of **Metal Industry**:

Please explain how Mr. Meyer obtains the factor 13.4 in his article on The Rapid Determination of Nickel and Chlorides in Plating Solutions (**Metal Industry**, September, 1934, page 307)?

Perth Amboy, N. J. John Rahos.

Your communication to **Metal Industry** in regard to the use of the factor 13.4 has been received. The 13.4 factor is related to the factor .134 for changing grams per liter into ounces per gallon.

To simplify the (NF) factor, we have:—

$$\text{Nickel Factor (NF)} = \frac{\text{wt. Nickel} \times 1000 \times .134}{\text{cc A} \times 10 \text{ cc}}$$

$$\text{NF} = \frac{\text{wt. Ni} \times 13.4}{\text{cc A}}$$

13.4 results because a 10 cc sample is used in the analysis for Ni and 10 cc is 1/100 of a liter. The number 13.4 changes the strength to a liter basis and then to a gallon basis in one operation. If a sample other than 10 cc is used the factor must be changed accordingly.

Bridgeport, Conn. W. R. Meyer.

From Old Subscribers

To the Editor of **Metal Industry**:

I am enclosing a check for the renewal of my subscription. I have been a subscriber to Metal Industry for many years—I really do not know how many. I find your publication very dependable and a constant help in our industry.

Edward W. T. Faint.

Allentown, Pa.

To the Editor of **Metal Industry**:

Enclosed please find check for $2.00 for a subscription for the coming year. I think enough of your paper to have renewed my subscription 30 times. It always contains the information that a foreman plater needs.

Charles H. Dunavan.

Hartford, Conn.

"Excellent Advice"

To the Editor of **Metal Industry**:

We have just completed a very difficult job of pewter cleaning following the instructions of your expert, and we sincerely wish to thank him for a very excellent bit of advice.

Ball and Ball.

New Books

Metal Industry, Bound Volume for 1934. Size 8 x 12; 448 pages. Price $3.00. Published by Metal Industry Publishing Company, 116 John Street, New York.

To our readers this book needs no introduction as it is a complete set of all of the issues of the past year. For those who wish to keep a permanent record of the progress of the various industries served by **Metal Industry**, there is no better, simpler or more concise form in which to have it than in the Bound Volume.

The volume is fully cross-indexed, making all references easy to find.

Testing Precious Metals with the Touchstone. By C. M. Hoke, consulting chemist. Published by the Jewelers' Technical Advice Company, 22 Albany Street, New York. Price $1.00.

This is the second edition of a book which was originally published in 1932. It contains a complete but brief description of the practical methods of testing precious metals. The touchstone method, which has been for generations used in testing gold alloys, has now been extended to platinum, palladium, silver, white golds, dental alloys and even nickel. This edition is enlarged by the edition of new chapters. One part discusses the buying and selling of old gold, silver and platinum. There is also an appendix which gives tables, the equipment used, a list of common alloys and metals with some of their properties, methods of determining the specific gravity, etc.

The book is the only one of its kind in a field that needs accurate technical advice. It should be a most valuable addition to the library of everyone connected in any way with the jewelry industry.

Technical Publications

Protective Value of Nickel and Chromium Plating on Steel. By William Blum, Paul W. C. Strausser[1] and Abner Brenner. Research Paper RP712. Part of Journal of Research of the National Bureau of Standards, Volume 13, September, 1934.

Exposure tests of plated steel were conducted in cooperation with the American Electroplaters' Society and the American Society for Testing Materials, in rural, suburban, industrial, and marine locations. It was found that the thickness of the nickel layer is more important than any other factor. An intermediate layer of copper decreases the protective value of thin deposits but is not detrimental in thick coatings, especially if they are chromium plated. The customary thin chromium coatings (0.00002 in. or 0.0005 mm) increase the resistance to tarnish, but not the protection against corrosion.

[1]Research Associate at the National Bureau of Standards for the American Electroplaters' Society.

Accelerated Tests of Nickel and Chromium Plating on Steel. By Paul W. Strausser[2], Abner Brenner, and William Blum. Research Paper RP724. Part of Journal of Research of the National Bureau of Standards, Volume 13, October, 1934.

Plated specimens similar to those used in atmospheric exposure tests were subjected to accelerated tests, especially by means of a salt spray and by intermittent immersion in a salt solution. The time required for the first appearance of slight rust in these tests was not consistent and had no direct relation to the protective value of the coatings. When the extent of rust at the end of a definite period, for example 100 hours, was recorded, the results were approximately parallel to those of atmospheric exposure. The protective value of a metallic coating of this type depends principally upon its freedom from porosity. The latter can be determined in a few minutes by the ferroxyl test.

[2]Research Associate at the National Bureau of Standards for the American Electroplaters' Society.

Government Publications

New Proposed Federal Specifications. Obtainable from Federal Specifications Board, Room 735, Federal Warehouse, Washington, D. C.

Wire Paper Clips.

Ash and Garbage Cans.

Heat Treated Aluminum Alloy Forgings.

Wire, Copper, Soft or Annealed.

New Simplified Practice Recommendations. Obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C. Price 5c each.

Simplified Practice Recommendation R30-28. Roofing Ternes, Reaffirmed.

Simplified Practice Recommendation for Wire Insect Screen Cloth, Reaffirmed.

Zinc Industry in 1934. Advance Summary. U. S. Bureau of Mines, Washington, D. C.

Shop Problems

This Department Will Answer Questions Relating to Shop Practice.

Alloy for Heater Couplings

Q.—Can you give us any information as to the manufacturing of brass brazed couplings which are used on the hot water heaters?

The analysis recommended is about 85% copper and 15% zinc. From our experience, it is a little difficult to run this mixture.

Any suggestion that you have as to handling this class of work, will be appreciated.

A.—The text books give formulae for brazing metal, 88% copper, 2 tin, 10 zinc. As this metal brazes readily, we believe you will find it an improvement over the mixture 85 copper and 15 zinc—at least, it should run much better.

W. J. R., Problem 5,346.

Black on Brass

Q.—I am experiencing trouble in obtaining a satisfactory black finish on small articles. I have tried several methods, neither of which seems to come up to requirements.

You will find enclosed numbered samples.

The shells numbered one, two and three were colored by means of an ammonia and copper carbonate solution. The color is satisfactory but requires lacquering to retain the finish. If left unlacquered for a month, they change to a brown as you will see in the case of sample No. 3. I do not want to lacquer the articles if possible because we often have to deal with large numbers at a time.

The shells numbered 4 were barrel plated in a black nickel solution—formula from **Platers' Guidebook.** The color is not a good black and flakes off on the edge which is turned over in the press.

The buckle numbered 5 is the finish we would like to obtain, and would be pleased if you could give us some idea as to how it is done. Failing that, I would like you to suggest some method which you think would meet our requirements.

Do you know of any other method besides nitric acid, that will produce a similar finish on small brass articles?

A.—We believe that the ammonia carbonate of copper solution is the best way to finish the work.

An arsenic cyanide dip solution can be used, but this finish will require lacquering, and so will the black nickel finish. In lacquering, the work can be placed in an oblique iron barrel containing a wire mesh screen supported an inch or so from the inside of the barrel and the lacquer sprayed upon the work while the barrel is revolving.

USE THIS BLANK FOR SOLUTION ANALYSIS INFORMATION

Fill in all items if possible.

Date.....

Name and address: .....**Employed by:** .....

Kind of solution: .....**Volume used:** .....

Tank length: .....**width:** .....**Solution depth:** .....

Anode surface, sq. ft.:.....**Cathode surface, sq. ft:** .....

Distance between anode and cathode: .....**Kind of anodes:** .....

Class of work being plated: .....**Original formula of solution:**.....

REMARKS: Describe trouble completely. Give cleaning methods employed. Send small sample of work showing defect if possible.

Use separate sheet if necessary. _____

_____

_____

_____

NOTE: Before taking sample of solution, bring it to proper operating level with water; stir thoroughly; take sample in 2 or 3 oz. clean bottle; label bottle with name of solution and name of sender. PACK IT PROPERLY and mail to METAL INDUSTRY, 116 John Street, New York City.

If a smooth finish resembling the buckle is desired, then the work should be bright dipped and steel ball burnished before finishing.

It is impossible to produce the same finish on the work you are doing, that is on the sample buckle, unless you can make your work from steel, case hardened. If you decide to do so we will be pleased to give you the method for producing this finish. O. J. S., Problem 5,347.

Burnished Gold Finish

Q.—Should it be convenient, we would appreciate an up to date formula together with necessary plating room operations on how to produce a high class burnished gold finish.

A.—In answering this question we presume you desire a hand bunished gold finish.

Formula for gold solution:

Gold as cyanide	10 dwt.
Phosphate soda	2 ozs.
Sodium cyanide	2 ozs.
Water	1 gallon

Operate the solution at 120° to 140° F., using 1 to 1½ volts and with cathode agitation. Plate the work for 20 to 30 minutes, and then burnish. O. J. S., Problem 5,348.

Nickel and pH Too Low

Q.—We are sending under separate cover one bottle of nickel solution that we would like to have you analyze for us and return your findings at the earliest convenience.

A.—Analysis of nickel solution:

Metallic nickel	1.29 ozs.
Chlorides	3.69 ozs.
pH	5.2

The metal content and the pH are both too low. Add 4 ozs. of single nickel salts and 4 cubic centimeters of 26° ammonia to each gallon of solution that the tank contains.

The chloride content is quite high, so do not add any more chlorides for some time to come.

O. J. S., Problem 5,349.

Nickel and Silver Troubles

Q.—Under separate cover I am sending 2 samples of plating solutions; 1 silver and 1 nickel. The nickel solution plates dark and streaky, also peels and has a lot of sediment which collects on the bottom of tank. Can this nickel bath be used as an undercoat for chromium plating?

The silver solution which is used exclusively for tableware plates brittle and streaky, also pitted and uneven on steel table knife blades. The 10 anodes in use (size 6" x 8" x ⅛") become black and muddy and will not permit more than 20 amps. (at 3 volts) to flow through 100 dessert knives. The solution is 5 years old and was made up with cyanide of potash. I have been doctoring this silver solution with sodium cyanide. Would this pit our work?

A.—Analysis of nickel solution:

Metallic nickel	3.04 ozs.
Chlorides	2.19 ozs.
pH	6.0

The solution should be in good operating condition, and if any trouble is encountered look to the current density and the cleaning methods used.

Analysis of silver solution:

Metallic silver	8.48 ozs.
Free cyanide	5.78 ozs.

The metal content is too high. We would suggest that you take one-half of the solution from the tank, then fill tank with water to proper solution level and add 50 lbs. of sodium cyanide. O. J. S., Problem 5,350.

Plating Zinc Base Alloy

Q.—We are having considerable trouble in plating metal consisting of 95% zinc and 5% aluminum. After we plate this metal it becomes blistered inside of 10 to 15 days. If you can give us the proper plating solution so this metal will not blister, it will be appreciated.

A.—When you mention that the deposit "becomes blistered", we presume you refer to the deposit of copper or brass.

This type of metal should be nickel plated before plating in any cyanide solution, to prevent blistering, and the following formula for a nickel solution is suggested to be used:

Double nickel salts	10 ozs.
Sodium chloride	7 ozs.
Sodium sulfate	4 ozs.
Boric acid	2 ozs.
Sodium citrate	1 oz.
Water	1 gallon

Operate solution at 80°F. and a pH of 6.0 or 6.2.

In cleaning the work use a mild alkaline cleaning solution and a 5% to 10% solution of muriatic acid as a dip solution previous to nickel plating. O. J. S., Problem 5,351.

Smooth Top Ingot

Q.—Being a subscriber of **Metal Industry,** I would appreciate receiving some information with regard to the following. I should like to know how some of the ingot manufacturers get a smooth top on their brass ingot, especially in their grade of 81 copper, 3 tin, 5 lead and 11 zinc.

A.—One of the methods used in producing the smooth top ingot is to place on top of your iron ingot mold a block of wood that covers the ingot mold, leaving only a small opening for pouring, and skim that end.

Another is to have the iron mold good and hot and put fine charcoal in the mold. See that all of the moisture is out of the charcoal before pouring in the metal.

We believe you will find the block of wood will give you the results you desire. W. J. R., Problem 5,352.

Season Cracks

Q.—Under separate cover we are sending two samples of a part which we make, marked No. 1. These parts are exactly as they drop from our machine. We are sending two samples marked No. 2. These have gone through a bright dip solution, and for some reason or another, after being dipped, they show cracks and faults, making the part valueless.

The bright dip solution is composed of 6 gals. of sulphuric acid, 66 deg.; 3 gallons nitric acid, 42 deg.; ½ cup common salt; all at room temperature. They are immersed for a few seconds only—just long enough for the acid to attack the skin and give us the bright finish. It is a pertinent fact, that the cracks and faults come only in that part of the barrel where the greatest draw is. Is our solution incorrect, or is it attacking a preponderance of zinc in the metal?

A.—The bright dip that you are using is the one generally used, and the trouble is not due to the composition of the bright dip.

The cracks in the barrel of the sample submitted are what is known as "season cracks" and can be eliminated by a low annealing process before bright dipping.

O. J. S., Problem 5,353.

Hydrogen Peroxide

Q.—Would like information on how to make 100 volume hydrogen peroxide.

A.—Hydrogen peroxide is prepared by the action of dilute sulfuric acid upon hydrated barium peroxide, and then a process of distillation is used to produce the 100 volume peroxide.

Chemical control and special equipment is necessary in the manufacturing process and it is impractical for one to try and make it unless the process is thoroughly under control.

O. J. S., Problem 5,354.

Patents

A Review of Current United States Patents of Interest

Printed copies of patents can be obtained for 10 cents each from the Commissioner of Patents, Washington, D. C.

1,969,019. Aug. 7, 1934. **Alloy.** Robert H. Leach, Fairfield, Conn., assignor to Handy & Harman, New York, N. Y.

1,969,054. Aug. 7, 1934. **Electrolytic Method and Apparatus.** Richard A. Wilkins, Rome, N. Y., assignor to Industrial Development Corporation, Boston.

1,969,166. Aug. 7, 1934. **Process for Making Colloidal Solutions of Metals and of Metallic Compounds in Polyalcohols and Product Obtained Thereby.** Carl Hermann von Hoessle, Radebeul-Dresden, Germany, assignor to Chemische Fabrik von Heyden, A. G., Radebeul, near Dresden, Germany.

1,969,205. Aug. 7, 1934. **Material Discharge Gun.** William P. Carr and Robert W. Tracy, Toledo, Ohio, assignors to The De Vilbiss Company, Toledo, Ohio.

1,969,387. Aug. 7, 1934. **Cleansing and Polishing Preparation.** Joseph A. Tumbler, Baltimore, Md., assignor to J. A. Tumbler Laboratories, Baltimore, Md.

1,969,396. Aug. 7, 1934. **Production of Metallic Articles.** Franz Duftschmid, Heidelberg, Germany, assignor to I. G. Farbenindustrie Aktiengesellschaft, Frankfort-on-the-Main, Germany.

1,969,553. Aug. 7, 1934. **Electrolyte for the Deposition of Copper and Copper Alloys.** Donald Gernes, Minneapolis, Minn.

1,969,702. Aug. 7, 1934. **High Electro-Conductive Copper Alloy and Process for Making the Same.** Donald K. Crampton, Marion, and John J. Vreeland, Waterbury, Conn.

1,969,728. Aug. 14, 1934. **Method of Making Metal Objects.** Solomon F. Cushman, Jr., Agawam, Mass.

1,970,186. Aug. 14, 1934. **Melting Furnace.** Herbert Pontzen, Heilbronn-Neckar, Germany, assignor to American Lurgi Corporation, New York, N. Y.

1,970,261. Aug. 14, 1934. **Flask Ring.** Joseph V. Turner, Wilson, N. C.

1,970,268. Aug. 14, 1934. **Method and Means for Bright Finishing Metals.** Arthur E. Bellis, Branford, Conn.

1,970,318. Aug. 14, 1934. **Silver Alloy.** Edward F. Kern, New York, N. Y., assignor to The American Metal Company, Limited, New York, N. Y.

1,970,319. Aug. 14, 1934. **Silver Alloy.** Edward F. Kern, New York, N. Y., assignor to The American Metal Company, Limited, New York, N. Y.

1,970,447. Aug. 14, 1934. **Automatic Return Type Plating Machine.** Victor Finston and Constantine G. Miller, Cicero, Ill., assignors to The Meaker Company, Cicero, Ill.

1,970,545. August 21, 1934. **Applicator for Polishing Compounds and Lubricants.** William Howard Chandler, Shaker Heights, Ohio, assignor to The Chandler Chemical Company, Cleveland, Ohio.

1,970,548. August 21, 1934. **Metal Finish.** Harrison M. Batten, Highland Park, and C. J. Welcome, Lansing, Mich., assignors to the City Auto Stamping Company, Toledo, Ohio.

1,970,549. August 21, 1934. **Process of Electroplating Bronze.** Harrison M. Batten, Toledo, and Carl J. Welcome, Maumee, Ohio, assignors to The City Auto Stamping Company, Toledo, Ohio.

1,970,642. August 21, 1934. **Electric Soldering Iron.** Edmund Batchelder, Brooklyn, N. Y.

1,970,650. August 21, 1934. **Method of Making Flexible Corrugated Tubular Metal Walls.** Weston M. Fulton, Knoxville, Tenn., assignor to The Fulton Sylphon Company, Knoxville, Tenn.

1,970,768. August 21, 1934. **Alloys.** Hector Rabezzana, Flint, and Ora S. Duffendack, Ann Arbor, Mich., assignors, by mesne assignments, to General Motors Corporation, Detroit, Mich.

1,970,779. August 21, 1934. **Equipment for Making Castings.** Frank T. Spikerman, Akron, and Earl F. Oyster, Shaker Heights, Ohio, assignors to The Osborn Manufacturing Company, Cleveland, Ohio.

1,970,804. August 21, 1934. **Electrode for Electrolytic Baths.** Paul C. Kerk, Malvern, Pa.

1,970,819. August 21, 1934. **Measuring Instrument.** Irving W. Reynolds and Arthur G. Beal, Foxboro, Mass., assignors to The Foxboro Company, Foxboro, Mass.

1,970,834. August 21, 1934. **Manufacture of Rubber Bonded Abrasive Articles.** Raymond C. Benner, Niagara Falls, N. Y., Garnett H. Porter, Pittsfield, Mass., and Charles S. Nelson, Niagara Falls, N. Y., assignors to The Carborundum Company, Niagara Falls, N. Y.

1,970,835. August 21, 1934. **Abrasive Article and Method of Making the Same.** Raymond C. Benner, Niagara Falls, N. Y., assignor to The Carborundum Company, Niagara Falls, N. Y.

1,970,850. August 21, 1934. **Electrochemical Treatment Machine.** Albert H. Hannon, Springfield, Ohio.

1,970,950. August 21, 1934. **Electrodeposition of Platinum Metals.** Edmund M. Wise, Westfield, N. J., assignor to The International Nickel Company, Inc., New York.

1,971,104. August 21, 1934. **Agitating Means for Wire Screen During Galvanizing Process.** Noah S. Harter, Waukegan, Ill., assignor to Cyclone Fence Company, Waukegan, Ill.

1,971,149. August 21, 1934. **Purification of Molten Metal.** William F. Zimmerli, Niagara Falls, N. Y., assignor to E. I. du Pont de Nemours & Company, Incorporated, Wilmington, Del.

1,971,220. August 21, 1934. **Galvanizing Machine.** Martin L. Hunker, Dover, Ohio, assignor to The Reeves Manufacturing Company, Dover, Ohio.

1,971,221. August 21, 1934. **Galvanizing Apparatus.** Martin L. Hunker and John M. Miller, Dover, Ohio, assignors to The Reeves Manufacturing Company, Dover, Ohio.

1,971,240. August 21, 1934. **Method of Coloring Aluminum.** Martin Tosterud, Arnold, Pa., assignor to Aluminum Company of America, Pittsburgh, Pa.

1,971,279. August 21, 1934. **Process and Contrivance for Producing Hollow Bodies by Casting.** Gunther Schwietzke, Dusseldorf, Germany.

1,971,416. August 28, 1934. **Recovery of Oxidized Copper.** Harmon E. Keyes, Miami, Ariz.

1,971,652. August 28, 1934. **Device for Casting Under Pressure.** Paul Haessler, Nuremberg, Germany.

1,971,666. August 28, 1934. **Apparatus for Heat Treating Strip Metal.** William R. Webster, Bridgeport, Conn.

1,971,761. August 28, 1934. **Protection of Metals.** William J. Travers, Buffalo, N. Y.

1,972,036. September 4, 1934. **Metallographic Polishing Machine.** John P. Buckley, Washington, D. C.

1,972,317. September 4, 1934. **Method for Inhibiting the Oxidation of Readily Oxidizable Metals.** Hans A. Reimers, Midland, Mich., assignor to The Dow Chemical Company, Midland, Mich.

1,972,432. September 4, 1934. **Production of Pure Aluminum-Silicon Alloys.** Conway (Baron) von Girsewald, Frankfort-on-the-Main, and Oskar Schober, Horrem, near Cologne-on-the-Rhine, Germany, assignors to American Lurgi Corporation, New York, N. Y.

1,972,684. September 4, 1934. **Apparatus for Extruding Metals.** Conrad C. Jacobson, Glen Ridge, N. J., assignor to John Robertson Co., Inc., Brooklyn, N. Y.

1,972,693. September 4, 1934. **Formation of Dense, Highly Lustrous and Impervious Deposits of Nickel.** Max Schlotter, Berlin, Germany.

1,972,709. September 4, 1934. **Weldless Cable Sheath Extrusion Apparatus.** Conrad C. Jacobson, Glen Ridge, N. J., assignor to John Robertson Co., Inc., Brooklyn, N. Y.

1,972,710. September 4, 1934. **Self-Charging Cable Sheath Extrusion Apparatus.** Conrad C. Jacobson, Glen Ridge, N. J., assignor to John Robertson Co., Inc., Brooklyn, N. Y.

1,972,766. September 4, 1934. **Heating, Ventilating, and Air Conditioning Apparatus.** Warren Ewald and John McElgin, Philadelphia, Pa.

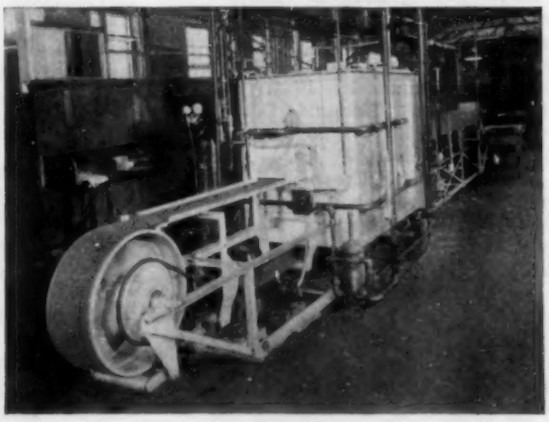
Equipment

New and Useful Devices, Metals, Machinery and Supplies

Continuous Controlled Atmosphere Furnaces

W. S. Rockwell Company, 50 Church Street, New York, have developed a continuous controlled atmosphere furnace of the conveyor belt type, with conditioned atmosphere, suitable for annealing, silver soldering, copper brazing and scaleless hardening; electric or fuel fired. This furnace, it is stated, is suitable for handling a large variety of miscellaneous moderate sized pieces; it obviates the necessity of the return of pans or other carrying means to charge the furnace. Another advantage claimed is that the low heat-absorption refractory insulating type linings reduce the standby losses and permit quick starting.

The conditioned atmosphere, it is stated, effects a large saving of equipment, labor and material by making cleaning, pickling and drying unnecessary. The furnace is recommended for heating formed parts, strips, strands, etc., which can be placed on some form of conveyor for their handling.



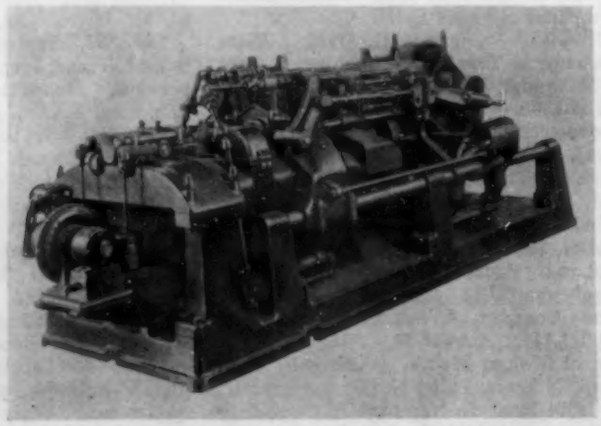
Rockwell Continuous, Controlled Atmosphere Furnace

New Die Casting Machine

The Madison-Kipp Corporation, 203 Waubesa Street, Madison, Wisc., has developed a new die casting machine, No. 5, which combines the features of their larger model No. 4, but is of such a size as to produce from 75 to 90 per cent of all die casting requirements in lead, tin, zinc and aluminum alloys.

Some of the specifications for this machine are as follows: Size 10″ x 14″; weight, net 11,000 pounds; volume, 340 cubic feet; length 135″, width, 46″; height 51″; machine speeds 8.33; 5.55; 4.16; 2.77 shots per minute.

Standard equipment consists of 3 H.P., variable speed, constant torque motor for AC current; electrical control drum; air pressure gooseneck (plunger type gooseneck can be supplied); gas burner and blower.



Madison-Kipp No. 5 Die Casting Machine

Latest Products

Each month the new products or services announced by companies in the metal and finishing equipment, supply and allied lines will be given brief mention here. More extended notices may appear later on any or all of these. In the meantime, complete data can be obtained from the companies mentioned.

Safety Switch. Adaptable to oil burners, air conditioning equipment, etc. Cutler-Hammer, Inc., 12th and St. Paul Avenue, Milwaukee, Wis.

Wrought Copper Fittings; solder and flared type; elbows, tees, couplings, unions, ⅜″ to 2″. American Brass Company, Waterbury, Conn.

Jetal Process for Coloring Iron and Steel Jet Black. Alrose Chemical Company, 80 Clifford Street, Providence, R. I.

New Portable Potentiometer; to enable pyrometer users to check their potentiometers, millivoltmeters and thermocouples quickly and accurately. Brown Instrument Company, Philadelphia, Pa.

New 2-Stage Centrifugal Pump. Worthington Company, Harrison, N. J.

New Flexible Chain Coupling. Baldwin-Duckworth Chain Corporation, Springfield, Mass.

Numerals in Colors for Multiple Point Recording. Leeds & Northrup Company, 4901 Stenton Avenue, Philadelphia, Pa.

Advanced Type Power Pump. Worthington Pump & Machinery Corporation, Harrison, N. J.

New Abrasive Grains

The General Abrasive Company's new polishing grain known as CBT Lionite is claimed to offer many advantages over ordinary abrasives. Chief among them is the fact that it is actually **etched.** Treated by a process which eats into the grain and develops small pores, it is said that the results attained are far more effective than from grains which receive their rough coating by means of surface deposits built up chemically.

The etching of CBT Lionite means that the grains themselves are rough and, according to the manufacturer, greater surface adhesion and faster, keener cutting are natural developments of this process. Other features claimed are polyhedral shape, proper temper, high capillarity, accurate grading and an average of over 95% alumina.

Information may be obtained from the General Abrasive Company, 3503 Hyde Park Blvd., Niagara Falls, N. Y.

Improved Rubber Tank Lining

The research division of the American Hard Rubber Company, 11 Mercer Street, New York has just announced an improvement in rubber linings for tanks used in processing operations employing highly corrosive solutions. The new lining, known as M R-10 is characterized by a high glaze surface which is said to offer greater resistance to acids and alkalis and is more easily cleaned.

The outer layer of glazed rubber is securely bonded to a relatively thin inner layer of soft rubber which is in turn vulcanized to the steel tank. This soft rubber lamination provides an elastic contact which compensates for contraction and expansion of metal and rubber during changes of temperature. It also acts as a shock absorber to protect the lining against accident and abuse.

Another feature of M R-10 lining is the use of heavy soft rubber fillets underneath the lining in all corners. The new lining is made of a better rubber compound which is said to offer longer and more efficient service as proved by actual service and laboratory tests.

Ace MR-10 Rubber Tank Lining

Sample test pieces are offered free to any manufacturer interested. The new lining is being offered at no advance in price.

Pyrometer for Taking Surface Temperatures of Revolving Rolls

The Illinois Testing Laboratories, Inc., 141 West Austin Avenue, Chicago, Illinois, has introduced a new Roll Type Pyrometer for measuring surface temperatures of revolving rolls and cylinders.

As will be noted from the illustration, this unit is self-contained. The indicator is mounted in a supporting arm which also holds the ribbon type thermo-couple. The thermo-couple consists of a ribbon or a flat strip type wire which is placed directly in contact with the revolving roll. This ribbon thermo-couple is held in a bow shaped assembly which provides suitable tension thus enabling the thermo-couple to be used on revolving rolls regardless of the diameter of the roll.

Roll Type Pyrometer

A grooved carbon block is attached to the thermo-couple assembly. The thermo-couple can be pressed only so far against the roll after which this carbon block will prevent further pressure.

The thermo-couple assembly, being provided with three adjustments, can be turned in either direction in relation to the extension arm in three different positions and held in place at the desired positions by means of set screws.

The indicator consists of a rugged millivoltmeter having a case diameter of 4½". The scale length is 3½" and can be graduated either 0-600, 0-800 or 0-1000° F. as desired. The instrument can be furnished with an internal automatic cold end compensator for atmospheric or room temperature variations.

New Bright Nickel Process

A new process for the electro-deposition of nickel will be shortly offered to the trade by the U. S. Galvanizing & Plating Equipment Corporation, 32 Stockton Street, Brooklyn, New York, who have obtained the exclusive rights for its general introduction, manufacture and sale in the United States and Canada, from Langbein Pfanhauser Werke, Leipzig, Germany,

This new process, it is stated, makes possible a nickel deposit of great brilliance, irrespective of thickness of such coatings, eliminating the necessity of subsequent polishing or color buffing, and simultaneously effects other economies and advantages in production, operation, maintenance, etc.

While plating as represented by the ordinary nickel bath with a brightening agent addition has been known and commercially used for years, its application has been limited to classes of work where relatively thin nickel deposits with varying hardness and brittleness of such bright nickel deposit is of no particular disadvantage. This new process is said to be basically different in composition, action, and results. The process, it is stated, has been adopted by over 200 concerns in Europe.

Among the advantages claimed for quality of product and operating economies are the following:

Nickel deposits of high brilliance with mirror-like finish, irrespective of thickness.

The elimination of subsequent polishing or color buffing.

Non-porous, close grained, elastic, ductile, adherent deposits which may be chrome plated without fear that the nickel deposit will lift or peel.

The elimination of recleaning or re-racking for chrome plating, provided a type of plating rack can be used which will not contaminate the various solutions by holding or absorbing the component solutions used.

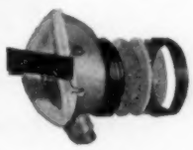
Unusual throwing power of chromium solution over this deposit.

A highly efficient and suitable electrolyte with a wide operating range.

This nickel plating process is suitable for still tank, semi-automatic or full automatic operation; requires no major changes from conventional types of equipment in use.

New Respirator

The Chicago Eye Shield Company, 2300 Warren Blvd., Chicago, Ill., have recently altered the design of their No. 81 Respirator. New features include anatomically shaped face cushion moulded of non-toxic rubber, replaceable knitted cloth facelet, and a new type "one-way" diaphragm relief valve that it is claimed, gives immediate release of all exhaled air without discomfort or interfering with wearers movements.



Chicago No. 81 Respirator

This respirator has a chemical cartridge filter, held in position by a screw cap. All inhaled air is drawn through the cartridge and an automatic check valve prevents exhaled air from passing back through the chemical filter. All metal parts are non-corrosive. Several types of cartridge filters with different chemical characteristics are available.

The respirator is designed for nose, mouth, throat and lung protection against light concentrations of injurious or obnoxious gases and vapors.

Foundry Equipment

Newman Brothers, Inc., successors to Newman Manufacturing Company, 416 Elm Street, Cincinnati, Ohio, manufacture a gyratory foundry riddle with some special features. This riddle is strongly constructed of steel tubing and very light in weight. It is gear-driven

and the motor can be easily removed; ⅛ h.p. motor of standard make, either D. C. or A.C., enclosed type, dust-proof. The riddle has an adjusted motion, the extent of which can be set to suit the plant conditions. It can be placed at variable heights, it is portable and will take any kind of standard riddle. Capacity is given as enough to keep at least 20 men supplied with sand.

The Newman company also manufactures the Newmanco swing lathe for polishing or grinding extra heavy pieces. This lathe is recommended for foundries and plating plants. Among its advantages claimed are the following.

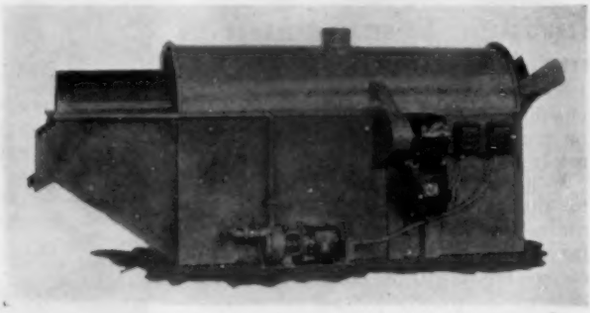
1. This lathe is full universal.
2. It uses a flat belt that is guaranteed to stay on.
3. Furnished complete and ready for attaching emery or polishing wheels.

Continuous Washer

A continuous washer for metal parts, that, it is said, subjects the work to a soaking and a spray wash and transfers it from one drum to another **without dropping it**—an important feature when handling threaded work and other delicate parts—is announced by N. Ransohoff, Inc., Cincinnati, Ohio.

In the first drum the work is eased along by a welded worm, submerged in hot cleaning compound that facilitates drying later. The dirt is completely loosened. The work passes (without dropping) through a patented head into the next compartment, perforated, where a hot spray removes loosened dirt and chips. The last section is a draining drum from which the work emerges to dry of its own heat. Fresh compound is pumped from a tank below. A skimming dam in the tank removes scum. A chip pan and removable screen chip basket effectively remove the chips.

The unit is completely self-contained. Driving motor and pump are hung on the side. Tight hood, to be connected to exhaust system, prevents escape of vapor to the room. Drum rolls on chilled rollers which turn free on roller bearing stub shafts. Drum and worm construction prevents work from sticking, insures all work coming out.



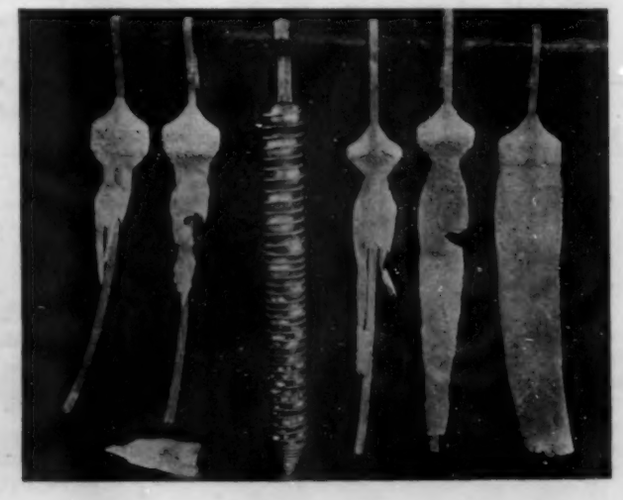
New Ideal Continuous Washer

Ball Anode Patented

U. S. Patent Reissue 19328 covering ball anodes for electroplating and containers for same has recently been granted by the United States Patent office. Through this new patent, The Udylite Company, Detroit, Michigan, now has exclusive rights to manufacture, sell and use ball and spheroidal anodes for electroplating. This company first introduced ball anodes to the plating industry as part of the Udylite Process of cadmium plating several years ago.

The features claimed for the ball anode are several. One of the most important is the maintenance of constant anode area at all times. This makes it possible to keep the metal content of the plating bath constant without the necessity of expensive salt additions. Another is the elimination of scrap metal losses. As the ball anodes corrode, they diminish in diameter and descend in the container. Fresh balls are added at the top. Even the smallest scraps of anode material are said to be completely used up in contrast to the bar or slab type anode, the use of which entails appreciable scrap losses.

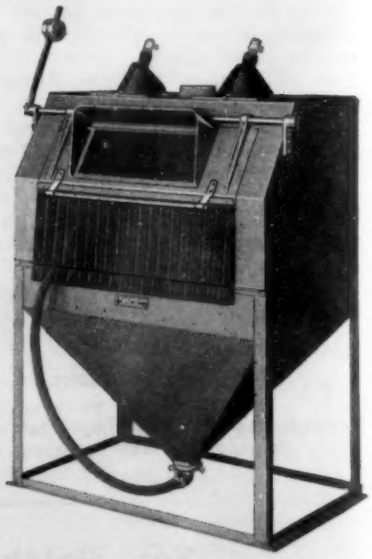
The ball anode provides, in addition, a most convenient method of anoding. The containers are filled from the top, and in even the largest installations, this operation involves but a few minutes of one man's time.



Comparison of Ball and Slab Anodes

Sand Blast Cabinets

The Ruemelin Manufacturing Company, 1574 South First Street, Milwaukee, Wis., has developed two new types of sand blast cabinets for special cleaning and finishing of manufactured articles. These types are known as Type AT and Type AG. Among the new features are all welded steel construction; one piece operator's vision screen with glare shield to exclude daylight from the line of vision; and automatic abrasive mixer with adjustment for any type of abrasive, including steel grit, steel shot, silica sand or fine powder.



New Ruemelin Sand Blast Cabinet

Cabinet type AT can be fitted with a rotatable hand wheel or with special fixtures or conveyors for production work. Type AG has a dust tight front door fitted with rubber gloves and leather gauntlets. The gun is mounted vertically, either rigidly or swung from the hinged support arm. The air valve is foot treadle operated. This type of cabinet is recommended especially for cleaning flat pieces or small delicate parts.

The Udylite Rheostat

For all electroplating processes, The Udylite Company, Detroit, Michigan, has designed and built a rheostat into which are said to be incorporated the features of close current regulation, ruggedness, compact construction and simplicity of operation.

Switch

The Udylite cam switch is designed to provide perfect contact at the low plating voltages. This perfect contact, it is claimed, is ensured by grinding the switch leaves when the switch is in a closed position. Ample contact surface and current carrying capacity have been provided.

The contact pressure firmly holds each leaf perfectly flush against the bus bar without distortion. Pressure is always perpendicular to the contact surface. It is equalized on all leaves and is equally divided between the two contact surfaces. Inner and outer leaves are made of heavy spring bronze while the current carrying center leaves are of spring brush copper. These materials, it is stated, maintain their shape indefinitely.

The leaves of the Udylite cam switch, it is claimed, are actually multiple cleaning units, providing a wiping action on the surface of the bus which keeps the contact surface clean and ensuring positive contact at all times and at all points; also that the switch, when open, cannot make an accidental sparking contact because of the sturdy steel spring which holds it away from the bus bar.

Resistors

Long life and ruggedness are stated as the characteristic of the Udylite resistors which are of helical coiled, nichrome wire. The low amperage coils, which generally receive hardest service, are overdimensioned for higher voltage drops. Coil brackets have unusually large radiating surface resulting in cooler contacts of the resistor coils.

Cooling the resistors is accomplished by a chimney draft action. Cool air is drawn upward through the resistors enclosed on four sides by the rheostat casting.

Instruments

The ammeter and voltmeter are securely fastened on the front of the board where they are in full view of the operator. The ammeter shunt is located below the resistors, away from heat, to ensure reliability of instrument readings. A double throw, single pole, voltmeter switch is mounted on the rheostat to permit reading of the voltage drop across the tank and across the line.

Finish

All contact surfaces of the Udylite rheostat are Udylited to permit positive transmission of electrical current. All metal parts, with the exception of switch leaves and resistance coils, are Udylited to prevent electroyltic corrosion as the result of contact between dissimilar metals.

Careful consideration has been given to appearance and finish. The symmetrical arrangement of switches, instruments and fastenings, together with the silvery lustre of the Udylite parts presents an attractive contrast against the black background of the panel.

Front View of Udylite Rheostat

New Rite Speed Lathe

In our December issue on page 430 we published a description of the new rite-speed lathe made by the Hammond Machinery Builders, Inc., 1603 Douglas Avenue, Kalamazoo, Mich.

In connection with this description was printed an illustration, which, unfortunately, was of the wrong machine.

The cut below shows the new CCO Overhanging Spindle Lathe made by the Hammond organization.

New CCO Overhanging Spindle Lathe

New Blast Mill

A new combination sand blast and tumbling mill has been developed by the W. W. Sly Manufacturing Company, Cleveland, Ohio. The following are some of the features of the mill:

Inside dimensions of mill barrel—42″ dia. x 36″ deep. Shell of ¾″ steel, perforated with ½″ holes to provide an outlet for the abrasive and dust and dirt. An outer shell of 3/16″ steel, slightly tapered, is attached to the mill barrel and revolves with it. The abrasive, etc., enters the space between the barrel and the outer shell through the perforations in the barrel. There is a spiral flight in this space which brings the abrasive to the forward high end of the tilted mill where it falls into buckets which raise it and discharge it into a feed hopper over the blower.

A blower direct connected to a 10 HP. motor is mounted against the high end of the tilted barrel with a nozzle (patent applied for) which directs the blast into the barrel at an angle so as to hit center of the load as it creeps up on one side of the revolving mill. The rate of feed is about a cubic foot per minute weighing, in case of metal abrasive, about 285 lbs., so that a total of 8 to 9 tons of abrasive passes through

the system per hour of blasting. This, however, is the same abrasive which passes through the system with almost every revolution of the mill, so that the actual quantity of abrasive in the system at any one time is probably less than a cubic foot.

A gearhead motor drives the mill and this motor is part of the mill construction. It is a two-speed motor, permitting the mill to revolve at 6 or 12 RPM. The door opening in the side of the mill barrel is 24" wide x 28" long. There is a small circular opening where the blast from the nozzle enters the barrel. There is no other opening in the barrel when the door is in place.

The load capacity of the barrel is about 10 to 15 cubic feet, represented by about 1,000 lbs. of castings—more or less—depending on type, size and nature of work. Any abrasive may be used in this mill—sand, or metallic grit or shot.

The advantages claimed for this new Sly mill are as follows:

Uses no compressed air.

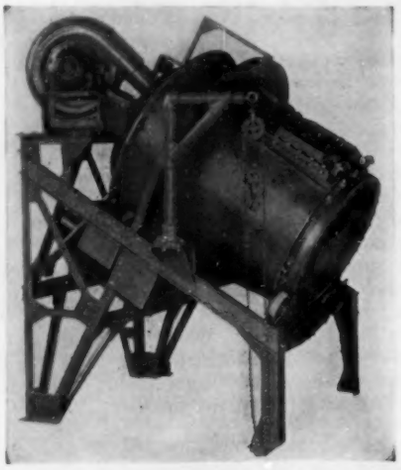
Eliminates all such items as elevator, tank, valves, abrasive lines, hose, small nozzles, compressed air lines, water separators.

No more moisture troubles, nozzle replacements, caking of abrasive, clogging of the nozzles.

Maintenance reduced to a minimum.

Mill barrel is a self-contained homogeneous unit from which dust and dirt and abrasive **cannot escape.**

A combination tumbling mill and blast mill—tumble for any length of time at 12 RPM; blast for any length of time at 6 RPM; or, tumble and blast simultaneously at 12 RPM.



New Sly Blast Mill

Easily loaded through a large door.

Easily unloaded by dumping into any suitable receptacle for which there is ample space underneath the barrel.

A one-piece revolving barrel for tumbling the work, for mixing the work, for returning the abrasive to the nozzle, for removing fines and dust from the abrasive; wear reduced to a minimum.

The abrasive does not come in contact with any part of the machine moving at high speed; wear from this cause is entirely eliminated.

Saving in cost particularly because of dependability for performance and greatly reduced maintenance.

Self-Fluxing Solder Paste

Solder—a real, self-fluxing, metal-tinning solder that produces results comparable in every respect with those obtained from regular bar or wire solder and one that is much easier to use—has, it is stated, recently been placed on the market in paste form by the Eagle-Picher Lead Company, Temple Bar Bldg., Cincinnati, Ohio, one of the world's largest producers of lead, zinc, and allied products. To solder with this product the edges are wiped clean, solder is applied, and the flame of a match or candle is directed on the metal close to the solder. In a few seconds, it is claimed, the heat reaches the solder and the action takes place, with the result that a smooth joint is made with a tensile strength of 14,000 pounds per square inch.

The material is also recommended for all metals except aluminum, but the method of joining them differs somewhat. When heavy metal, for example, is being joined, more heat is required, and when galvanized metal is encountered, muriatic acid is recommended to dissolve the coating so that the solder can fuse with the base metal.

Eagle Solder, it is stated, has none of the undesirable characteristics of many so-called cold or "liquid" solders. The manufacturers state that it is a real metal-tinning solder; it never hardens permanently (can be quickly softened by placing package in warm room or warm water); its flux has been approved by the National Board of Fire Underwriters; and it is a good conductor of electricity; that it is everything that ordinary solder is, and has the distinct advantage of being more convenient to use.

Primarily designed for radio, electrical, auto, and general household use, the paste was first packaged in a collapsible tube. Now it is also sold in one and five pound cans so that industrial users of solder who desire a more convenient product can purchase it economically.

Industrial Tractor

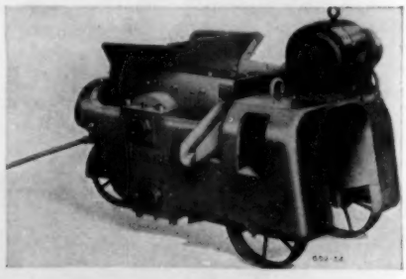
A new all-purpose industrial tractor, in three models, is announced by Clark Tructractor Company, Battle Creek, Michigan, "Clarktor-6".

"Clarktor-6" has a 46 h.p. 6-cylinder power plant and its designers claim for it an efficiency hitherto unknown in industrial tractors—a pound of drawbar pull for every pound of tractor weight. Heavy duty Clark transmission and special gear ratios in double reduction rear axle make a wide range of speeds available to handle various types of service—speeds as high as 18 m.p.h. All models have self-starter, generator, battery, electric horn, front bumper plate, eye coupler, pneumatic tires. Lights are available on all models, to facilitate night operations. Gas power makes 24-hour uninterrupted service possible. Included in the extra equipment available are dual pneumatic or solid tires, special couplers, Clark condensing muffler, speedometer, etc.

Three models comprise the line—"Light" for general industrial use; "Speed" especially suitable for airport, hangar and country club service; and "Heavy" for the tougher towing assignments, such as steep grades for trailer trains and the bothersome "spotting" or shifting of freight cars on sidings.

Sand Conditioner

A portable machine that screens and conditions molding sand for re-use has recently been developed by the Jeffrey Manufacturing Company, Columbus, Ohio. The machine has been designed with a vibrating screen as one of its principal elements. The screen operation is followed by mixing, blending, cutting and aeration and the delivery of the sand to the rear of the machine.



The capacity of the machine is from 10 to 15 tons per hour. It is run by a two-H.P. motor at 1800 R.P.M., with a push button starter The weight is approximately 1100 pounds.

Some of the features claimed for this machine are:

1. Thorough screening, continuous separation from the sand or refuse, such as nails, rods, gaggers, bits of core, pieces of metal, etc. The machine need not be stopped to pick up the refuse.
2. Breaks up lumps in the sand.
3. Thoroughly cools, blends and aerates the sand.
4. Does not destroy bond by raking or scraping.
5. Throws the sand into fluffy piles in perfect condition for re-use.

Catalogs

Armorock. A floor resurfacing and repairing material that resists heavy trucking, acid, alkali and water. Hunkins, Willis Lime and Cement Company, 4480 Duncan Avenue, St. Louis, Mo. (269)

Quandt Core Oil. Quandt Chemical Company, 374 Guerrero Street, San Francisco, Calif. (270)

Polishing, Plating and Finishing Equipment and Supplies. J. J. Siefen Company, 1936 W. Lafayette Blvd., Cleveland, Ohio. (271)

pH Testing by the Indicator Strip Method. Pfaltz and Bauer, Inc., 300 Pearl Street, New York. (272)

Filtrations in Chemical Laboratories. A handbook for the chemist. Carl Schleicher and Schull Company, 167 East 33rd Street, New York City. (273)

"What About Your Roofs?" Johns-Manville, 22 E. 40th Street, New York City. (274)

How to Figure Expansion Loops in Piping and Tubing. A chart drawn up by Tube-Turns, Inc., 425 5th Street, Louisville, Ky. (275)

Arc Welders. General Electric Company, Schenectady, N. Y. (276)

Welding Electrodes and Accessories. General Electric Company, Schenectady, N. Y. (277)

The American Line of Foundry Equipment: Airless Wheelabrator Abrasive Cleaning Equipment; Abrasive Blast Equipment of all Types; Dust Collectors; Sand Cutting Machines; Aluminum Taper Flasks; Pouring Jackets; Core Machines; Rod Straighteners; Wheelabrator Shot and Grit; Long Lyfe Nozzles. The American Foundry Equipment Company, Mishawaka, Ind. (280)

Motor Price Wheel. A device which tells the frame sizes and list prices of 448 sizes and types of electric motors. Louis Allis Company, Milwaukee, Wis. (281)

Pyro Immersion Pyrometer for Non-Ferrous Metals. Pyrometer Instrument Company, 103 Lafayette Street, New York. (282)

The Oasis. A house organ, describing new developments in metal finishing, lacquering, etc. Egyptian Lacquer Manufacturing Company, Inc., 90 West Street, New York. (283)

Airguide Air Condition Indicator. Thwing Instrument Company, 3339 Lancaster Avenue, Philadelphia, Pa. (284)

Centrifugal Pumps; Single-Stage Volute; Type L, LA and LC. Worthington Pump and Machinery Corporation, Harrison, N. J. (285)

Turbines for Mechanical Drive. Single-stage and multi-stage, from 40 to 2000 hp. General Electric Company, Schenectady, N. Y. (286)

Metal-Enclosed Switchgear. General Electric Company, Schenectady, N. Y. (287)

Brush Phase of Motor Maintenance. Ohio Carbon Company, 12508 Berea Road, Lakewood, Ohio. (288)

"How Good Are You at Twisting and Bending?" A question 3500 lacquer users are being asked in this new booklet. Roxalin Flexible Lacquer Company, 800 Magnolia Avenue, Elizabeth, N. J. (289)

Oil Proof Rubber Cement by Thiokol. Thiokol Corporation, Yardville (Tren- N. J. (290)

Arc Welder AC Motor Driven Types SAC 300, SAC 500. Lincoln Electric Company, Cleveland, Ohio. (291)

Grinding Wheel Information and Selection. A very informative booklet giving wheel specifications, variable factors, tables, operating rules, etc. Norton Company, Worcester, Mass. (292)

19th Annual Review of the Silver Market—1934. Handy & Harman, 82 Fulton Street, New York. (293)

Trigonograph. A new quick numerical calculator and complete trigonometric function table on a single page. Chemical Rubber Publishing Company, Cleveland, Ohio. (294)

The Udylite Rheostat. The Udylite Company, 1651 E. Grand Blvd., Detroit, Mich. (295)

Save time. Use the coupon below to get any of the above catalogs or bulletins, or for data on any subject not mentioned this month. METAL INDUSTRY will see that you get them promptly.

METAL INDUSTRY
116 John Street, New York.

(Insert below the number in parentheses at end of each item desired.)

I wish to receive the following bulletins mentioned in January, 1935 .....

.....

I want information on the following equipment or materials also: .....

.....

Associations and Societies

American Electroplaters' Society

Secretary E. Steen Thompson, 905 W. 10th Street, Erie, Pa.

Plans have been maturing for the 1935 convention and exhibition of electroplating equipment and supplies, which will be held June 10-14, in Bridgeport, Conn. Eugene Phillips of the Puritan Company, Waterbury, Conn., has been appointed chairman of the Publicity Committee. R. T. Phipps of the Bullard Company, Bridgeport, Conn., has been engaged as business manager of the exhibition.

This exhibition, which will be the most complete in the history of the American Electroplaters' Society, will include electroplating supplies, equipment, and representative materials plated by some key industries. These materials will be confined to New England, perhaps even to Connecticut, since 1935 is the Tercentenary of the founding of Connecticut.

The program has not yet been finally settled, but it will include three main divisions.

1. International Fellowship Club meeting.

2. Plant visits. One whole day will be devoted to a "plant trip" which will include some of the largest factories in Connecticut. The plants visited will be peculiar to New England industries.

3. Technical Papers. The following have been already definitely arranged for.

The Manufacturer and the Plater, by A. P. Munning. The Society is honored by Mr. Munning's acceptance of the invitation to deliver a paper on this subject as Mr. Munning is undoubtedly the best man available in all ways, because of his knowledge, experience and unbiased point of view.

Other papers will be delivered on the following subjects.

X-Ray Examination of Electroplating Problems.

Why Metals Corrode.

Metal Spraying.

Air Conditioning Plating, Polishing and Lacquering Rooms.

Optimum Metal Concentration of Plating Solutions.

Making the Plating Room a Better Place in Which to Live.

The Mechanism of Electrodeposition.

The Story of Synthetic Resins.

Measuring the Thickness of Electrodeposited Coatings.

The authors will be the best in the electroplating world in their respective fields.

One whole day will be devoted to papers by practical men from New England. This will be New England Day. The Charles H. Proctor medal which has not been awarded for some years, will therefore, be available in 1936, because this convention is giving the practical men their opportunity. It is hoped that this custom will continue in order to encourage practical men to write more freely.

A specially attractive program has been arranged for the ladies. New England is noted for its manufacture of household goods, decorations and home appliances, and the ladies will have every opportunity to see these articles being made.

It is very timely that this convention will be held in Connecticut because, as stated above, 1935 is the Tercentenary of the founding of that state. The slogan of this convention is "How It Is Done." It is a slogan peculiarly suitable to New England as this section has long been famous for knowing "how it is done."

Platers, chemists, superintendents, managers and manufacturers in any way connected with electroplating are urged to begin to lay their plans now to attend this convention.

Chicago Branch A. E. S.

Care of J. W. Hanlon, 3004 N. Whipple Street, Chicago, Ill.

The Chicago Branch of the American Electroplaters' Society will hold its 23rd annual banquet and educational meeting at the Hotel La Salle, Saturday, January 19, 1935. The educational meeting will begin at 2:30; the banquet at 7:00 P. M., which will be followed by a dance and entertainment.

Tickets are priced at $2.50, obtainable from the secretary at the above address. A hearty welcome is extended to everyone.

Electrochemical Society

Columbia University, New York

The Spring Meeting in 1935, of the Electrochemical Society will be held in New Orleans, La., March 21-23, at the Hotel Roosevelt. One whole afternoon session will be in charge of the Electrodeposition Division. Full details will be published in a later issue.

Institute of Metals Division

29 W. 39th Street, New York

Nominations for officers of the Institute of Metals Division of the American Institute of Mining and Metallurgical Engineers for the coming year have been made by the various nominating committees appointed for the purpose, and are as follows:

Chairman—W. M. Peirce.

Vice-Chairmen—E. H. Dix, Jr., A. J. Phillips.

Secretary—E. M. Wise.

Executive Committee (for three years) **—W. H. Bassett, Jr., O. W. Ellis, W. E. Remmers.**

Connecticut Non-Ferrous Foundrymen's Association

Care of L. G. Tarantino, 523 W. Taft Avenue, Bridgeport, Conn.

The December meeting of this Association was held at the Hotel Garde, New Haven, Conn., on Tuesday, December 11th. A very interesting talk with film illustrations was delivered by J. A. King of the Carborundum Company on the subject of Refractories. Officers for 1935 were elected as follows: President, **David Tamor,** Reading, Pratt & Cady Company, Hartford, Conn.; Vice-president, **Joseph T. Judge,** Jenkins Brothers Company, Bridgeport, Conn.; Treasurer, **D. Wesley Case,** Belknap Manufacturing Company, Bridgeport, Conn.; Secretary, **Louis G. Tarantino,** 523 W. Taft Avenue, Bridgeport, Conn.; Executive Committee: Chairman, **H. Thompson,** Peck Brothers Company, New Haven, Conn.; **Benjamin Stewart,** Bridgeport Deoxidized Bronze Company, Bridgeport, Conn.; **G. F. Winslow,** Bradley & Hubbard Company, Meriden, Conn.; **M. F. Hanley,** Scovill Manufacturing Company, Waterville, Conn.; **Ernest Stone,** Consolidated Ashcroft Hancock Company, Bridgeport, Conn.; Program Committee: Chairman, **Frank B. Diana,** Whipple and Choate Company, Bridgeport, Conn.; **Joseph T. Judge** and **L. G. Tarantino.**

The next meeting will be held on Tuesday, January 15th at the Hotel Garde, New Haven, with the Program Committee arranging a meeting on Facings, Dressings and Partings. Future meetings are changed to the third Tuesdays of each month.

Chicago Chapter, A. S. M.

1140 W. Washington Blvd.

The regular meeting of the Chicago Chapter of the American Society for Metals was held December 13th, 1934, at the Chicago Medinah Club. The guest speaker of the evening was Dr. D. K. Crampton, Director of Research, Chase Brass & Copper Company. Dr. Crampton's subject, "Copper and its Alloys," was most illuminating. Various types of refined copper alloys were spoken of, covering the characteristic elements usually present in amounts sufficient to effect workability or properties.

Hardness characteristics of various alloys of copper and oxygen before and after annealing were spoken of. Physical properties were also shown for these alloys including impact values, mass conductivity, comparative densities, and so on. Also tensile elongation and mass conductivity were spoken of.

Embrittling effect of bismuth was also mentioned. An equilibrium diagram of copper solid solution with ferrite was shown.

The hardening of copper alloys, once considered to be confined entirely within the arts of the alchemist, is now commercially quite commonly used and is explained as the better known process of age hardening.

Slides were shown indicating the loss of strength incurred during corrosion tests.

Mr. J. W. Scott, Technical Chairman then opened the meeting to general discussion.

American Standards Association

29 W. 39th Street, New York

Howard Coonley, president of the Walworth Company, was re-elected president of the American Standards Association for 1935. Frederick E. Moskovics, representing the Society of Automotive Engineers, was re-elected vice-president. Mr. Coonley, who represents the American Society of Mechanical Engineers, has served two terms as president.

Association of Consulting Chemists and Chemical Engineers

50 E. 41st Street, New York

The Association of Consulting Chemists and Chemical Engineers is an organization having for its object the improvement of consulting practice in the fields of chemistry and chemical engineering. The association was organized about six years ago. Membership is by invitation only. A membership committee endeavors to see that invitations are extended to all consultants who meet the standards of competence and professional ethics set by the association.

The association has recently revised its Code of Ethics with a view to further clarifying the relations of a consultant to the public, the client and the fellow consultant.

The present officers are: Past President, **S. S. Sadtler;** President, **Thomas A. Wright;** Vice-president, **Frank G. Breyer;** Secretary, **Paul Mahler;** Treasurer, **Alvin C. Purdy.**

National Metal Exposition

7016 Euclid Street, Cleveland, Ohio

The National Metal Exposition for 1935 will be held in Chicago, Ill., at the new International Amphitheatre, from September 30 to October 4.

Information can be obtained from the American Society for Metals at the above address.

National Code Institute

292 Madison Avenue, New York

The National Code Institute is an organization which has been formed for the purpose of representing the interests of individual firms and groups with respect to problems rising under the various codes of their respective industries. It also will act as a clearing house for the mutual exchange of experiences under different code regulations. Dr. Bruno Burn, is president and John R. Beecroft is vice-president.

Copper & Brass Research Association

25 Broadway, New York

At a reorganization meeting of the Copper & Brass Research Association held at its offices, 25 Broadway, New York, in December, the mining companies withdrew and the fabricating members formulated plans for a promotional campaign for the forthcoming year.

The following officers were elected:

President, F. S. Chase, President of Chase Brass & Copper Company.

Vice-Presidents: John A. Coe, President of the American Brass Company; **C. D. Dallas,** President of Revere Copper and Brass Incorporated; **Wylie Brown,** President of Phelps Dodge Copper Products Corporation.

Treasurer, C. T. Ulrich, Vice-President and Treasurer of Kennecott Copper Corporation.

Secretary, B. B. Caddle.

Those elected to the Board of Directors are: **F. S. Chase** and **R. L. Coe,** Chase Brass & Copper Company; **C. D. Dallas** and **J. A. Doucett,** Revere Copper & Brass Incorporated; **John A. Coe** and **John A. Coe, Jr.,** The American Brass Company; **E. O. Goss** and **W. M. Goss,** Scovill Manufacturing Company; **R. E. Day** and **Herman W. Steinkraus,** Bridgeport Brass Company; **Wylie Brown** and **H. A. Staples,** Phelps Dodge Copper Products Corporation; **C. C. Limbocker,** Wolverine Tube Company; **C. T. Ulrich,** Kennecott Copper Corporation and **B. B. Caddle,** Secretary of the Association.

An operating committee was appointed consisting of **J. A. Doucett,** Chairman; **R. L. Coe, John A. Coe, Jr., Herman W. Steinkraus** and **W. M. Goss.**

Personals

Dr. D. K. Crampton

Dr. D. K. Crampton, Director of Research, Chase Brass & Copper Company, Waterbury, Conn., was recently reelected secretary of the American Society for Testing Materials Committee B-5 on Copper and Copper Alloys, Cast and Wrought.

Dr. D. K. Crampton

Dr. Crampton received the following degrees from Yale University: Ph.B., 1916; M.S., 1918; Ph.D., 1932. On graduation in 1916 he was employed by The Chase Companies as Assistant in the Metallurgical Division, becoming Chief Metallurgist in 1921 and in his present position in 1924. He is a member and has been active in the affairs of the following technical societies: American Society of Mechanical Engineers, American Institute of Mining and Metallurgical Engineers, American Electrochemical Society, British Institute of Metals, and American Welding Society.

In addition to his office in Committee B-5, Dr. Crampton is active on Committees B-2 on Non-Ferrous Metals and Alloys, and B-3 on Corrosion of Non-Ferrous Metals and Alloys, serving as chairman of a subcommittee of the latter. He is interested in the work of Committee E-1 on Methods of Testing and E-2 on Spectrographic Analysis.

Dr. Blum Going Abroad

The Faraday Society is planning a symposium upon "The Structure of Metallic Coatings, Films, and Surfaces" in London on March 29 and 30, 1935. Among those invited to participate are Dr. William Blum and Dr. Charles Kasper of the National Bureau of Standards, who are preparing a paper upon structure of nickel deposits.

Dr. Blum expects to present this paper in person, and also to attend meetings of the Electrodepositors Technical Society in Birmingham and London. He will spend about a month in visiting plants and research laboratories in England, France and Germany that are of interest in connection with electrodeposition.

Dr. William Blum

A. P. Munning Returns to the Plating Industry

Due to a continually increasing amount of business and various problems connected with the development of new processes, etc., the Hanson-Van Winkle-Munning Company of Matawan, N. J., has arranged to have A. P. Munning who was the Chairman of their Board

A. P. Munning

of Directors until March 1930, again become actively associated with them, beginning January 1935. It is understood that Mr. Munning will occupy a high executive position, and will devote himself to the larger and broader aspects of the Company's business. There will be no change in the officers or directors of the company.

In the discussion of this matter with Mr. Munning he asked us to convey his best wishes to all of his old friends and associates in the industry, and stated that he hoped to be of such service as he possibly could render to everyone connected within or without the industry in any matters relating to the improvement of the industry or the parties therein.

C. B. F. Young Gives Course in Electro-Plating

C. B. F. Young, who was recently made Technical Director of the United States Research Corp., 40-35 21st Street, Long Island City, N. Y., during Dr. L. C. Pan's leave, will give a course in Practical Electroplating at Columbia University, New York.

The new course will consist of two 3-hour meetings per week. The first hour will consist of a lecture concerning the application of the modern theories of electrochemistry to electroplating. All electroplaters are invited to take this course. For further information apply to University Extension, Columbia University, N. Y. City.

Mr. Young attended Howard College, Birmingham, Ala. On receiving his B. S. degree in chemistry from the above institution he was appointed an assistant in the Department of Chemistry, Columbia University. At this institution he was head of the Lecture Demonstration

Department for two years. He resigned this position and was appointed Assistant Curator of the Chandler Chemical Museum. During this time he continued his studies in electrochemistry under Prof. C. G. Fink. The degree of Master of Science was conferred upon Mr. Young by Columbia University in 1932.

Mr. Young will receive his Doctorate very shortly, having completed his research work on "The Deposition of Alloys from Acid Sulphate Solutions."

M. L. Murray has been elected president and general manager of the Nickel Alloy Company, Philadelphia, Pa., maker of resistance wire, pure nickel and nickel alloys. Mr. Murray has been identified with the wire business for the last forty years. The company has recently installed new equipment for wire drawing and cold rolling.

David M. Curry has joined the development and reasearch staff of the International Nickel Company, 67 Wall Street, New York having formerly been with the Ford Motor Company.

Dr. Irving Langmuir has been awarded the Fourth Order of the Rising Sun by the Government of Japan, where he has been delivering a series of lectures for the Iwadare Foundation, which is operated by the Japanese Institute of Electrical Engineers. The decoration is bestowed by Japan in recognition of distinguished service. Mr. Langmuir is Associate Director of the General Electric Research Laboratory, Schenectady, N. Y. He is at present on a trip through Japan, China, Siam, India and Egypt.

Below is a paragraph from a letter from Dr. Langmuir to his brother, A. C. Langmuir of Hastings-on-the-Hudson, N. Y., describing his impressions of Japan.

"The country (Japan) seems remarkably prosperous and the people are all busy. Steel works are operating at full capacity and additions to plants are being constructed everywhere. New roads and railroads and every kind of public works are under construction. Far more labor saving devices are used even on the farms than you see in Europe. There is no trace of antagonism or unfriendliness to Americans. Cleanliness of the people and their customs is noteworthy. There is good water for drinking and water supply everywhere. The forests are very beautiful."

H. S. Arnold, who has been since 1929 manager of the production department of the International Nickel Company, 67 Wall Street, New York, has been made technical assistant to the vice-president.

J. D. Conover, for several years secretary of the American Zinc Institute, 60 E. 42nd Street, New York, has resigned from that position to become secretary of the American Mining and Congress in Washington, D. C.

Dr. P. D. Merica, assistant to the president of the International Nickel Company, 67 Wall Street, New York, has been nominated for vice-president of the American Institute of Mining and Metallurgical Engineers. He has also been elected a director of the International Nickel Company.

G. C. Stone has been nominated to receive the James Douglas medal of the American Institute of Mining and Metallurgical Engineers. Mr. Stone was with the New Jersey Zinc Company, 160 Front Street, New York, from 1882 until 1929 when he retired. A more extended biography of Mr. Stone will be published in an early issue of the **Metal Industry.**

James G. Vail, vice-president and chemical director of the Philadelphia Quartz Company, Philadelphia, Pa., will give a series of Christmas Week Lectures at the Franklin Institute, Parkway and 20th Street, Philadelphia, Pa., for young people.

Fred S. Winfield has joined the field staff of Aluminum Industries, Inc., Cincinnati, Ohio, as sales engineer.

F. L. LaQue of the Development and Research Department, The International Nickel Company, Inc., 67 Wall Street, New York, presented a paper entitled "Inconel, an Alloy for Textile Wet Processing Equipment", at the Annual Meeting of the American Association of Textile Colorists and Chemists. The meeting was held in New York City at the Hotel New Yorker on Saturday afternoon, December 8th.

Charles Pack has rejoined the Doehler Die Casting Company, Toledo, Ohio, as assistant to the president in charge of all research and development.

Dr. H. W. Gillett, of the Battelle Memorial Institute has been appointed representative of the American Society for Testing Materials on the division of Engineering and Industrial Research Council.

C. L. Hippensteel, Bell Telephone Laboratories, Inc., **J. R. Freeman,** American Brass Company and **J. C. Fox,** Doehler Die Casting Company, have been appointed by the American Society for Testing Materials to serve on a Joint Committee with representatives of the Bureau of Standards and the American Electro-Platers' Society to study exposure tests of plating on non-ferrous metals.

Obituaries

George B. Walker

George B. Walker, 71 years of age, treasurer and director of Whitehead Bros. Company, 537 W. 27th Street, N. Y., and for 51 years connected with that company, died in Chatham, N. J., November 1st. He was also treasurer of the Penn Facing Mills Company, Irwin, Pa.

U. E. Kanavel

U. E. Kanavel one of the organizers of the Peerless Sand Company, Conneaut, Ohio, died in that city recently. Mr. Kanavel was born in 1864 at West Carlisle, Ohio. In 1905 he organized the Interstate Sand Company, remaining with the company for five years. He then moved to Conneaut becoming associated with F. E. Gordon in the Ohio Sand Company. Mr. Kanavel organized the Peerless Sand Company with Fred Moore and C. M. Bixler in 1918. He retired from active business in 1923.

Mr. Kanavel was very active in social and philanthropic work in his city. He was a member of the Chamber of Commerce and a director in a savings bank and a building loan company. He was an active Mason and one of the prominent figures in his locality.

Charles O. Bartlett

Charles O. Bartlett, 84, who with K. F. Snow in 1885 founded the C. O. Bartlett and Snow Company, Cleveland, Ohio, manufacturers of heavy machinery, foundry equipment and other products, died at his home in Brecksville, Ohio, near Cleveland, November 28. Mr. Bartlett was born in Strongsville, Ohio, and as a young man operated several mills before founding the machinery company. He was president of the C. O. Bartlett and Snow Company until 1922 when he retired, but continued his interest in the affairs of the organization. He was active in work of the National Metal Trades Association for a number of years, serving in 1918 as president of the Cleveland branch of that organization.

Herbert J. Beck

Herbert J. Beck, director, assistant treasurer and factory sales manager for Aluminum Industries, Inc., of Cincinnati, died suddenly at the Company's office, Friday, December 14th. Many months spent in government hospitals and at Mayo Brothers had failed to effect a permanent cure of ailments which had resulted from gas and shrapnel wounds sustained during the World War. For the past two years he had been in poor health.

Mr. Beck had been with Aluminum Industries since the Company was formed and was known widely throughout the industry. He was 39 years old and a native of Cincinnati. He was buried in St. Mary's cemetery in Cincinnati Monday, Dec. 17.

Walter Macleod

Walter Macleod, British vice-consul for southern Ohio, president of Macleod Company, manufacturer of sand-blast equipment and foundry supplies died at his home in Cincinnati, on December 18th. At the age of 14 Mr. Macleod went to Manchester, England, to live with an uncle and there was an apprentice for seven years in an engineering works. He was a pioneer sand-blast equipment manufacturer in this country.

J. Forrest Hahn

J. Forrest Hahn, died on December 1st. Mr. Hahn was vice-president and treasurer of the National Enameling and Stamping Company, Milwaukee.

William W. Macon

William W. Macon, formerly Editor in Chief of Iron Age died on January 1, 1935 of a cerebral hemorrhage. He was 59 years old. Mr. Macon had been with Iron Age since 1911 as managing editor, editor-in-chief and consultant.

David Rees Bowen

David Rees Bowen, vice-president of Farrel-Birmingham Company, Inc., and for forty-five years its chief engineer, died at his home at Ansonia, Conn., on Saturday, December 29, 1934.

Mr. Bowen was born in Cwmavon, Wales, October 22, 1865. He received his early education in the British National Schools and at Llandovery Collegiate School. At the age of 17 he came to the United States with his parents and in 1883 entered the employ of the Farrel Foundry & Machine Co., as a machinist's apprentice. During the next fifteen years his exceptional ability as an engineer led to his appointment as chief engineer, a position which he held until 1930, when he was elected vice-president, in charge of engineering. In July, 1933 ill health compelled him to relinquish active direction of engineering. Mr. Bowen became consulting engineer, continuing as vice-president.

Necrology

Among the men of prominence in the metal industries who passed away during 1934 were the following:

Frederic B. Stevens, President, Frederic B. Stevens, Inc.

Paul Maehler, President, Paul Maehler Co., Chicago.

Edward F. Wickwire, Vice-president, Ohio Brass Co., Mansfield, O.

John N. Harmon, Manager Factory N. International Silver Co., Meriden.

Clarence P. Bradley, President, Bradley and Hubbard Mfg. Co., Meriden.

Dr. Walter Rosenhain, Superintendent of Metallurgical Research, National Physical Laboratory, London, England.

Alton Farrel, formerly Treasurer, Farrel-Birmingham Co., Inc., Ansonia.

Edmund W. Zeh, President, Zeh and Hahnemann Co., New York.

E. W. Heil, Plating Superintendent, Coleman Lamp and Stove Co., Wichita.

George Andrew Boomer, Manager, Plume and Atwood Co., Waterbury.

Thomas B. Kent, formerly Vice-president, American Brass Co., Waterbury.

George H. Barbour, Chairman of the Board, Detroit Stove Co., and founder of the Michigan Copper and Brass Co.

Fred Haushalter, Past President, New York Branch, A.E.S.

Samuel T. Johnston, formerly Vice-president, S. Obermayer Co., Chicago.

Alfred J. Jupp, Vice-president, Lunkenheimer Co., Cincinnati, O.

James D. Erskine, formerly President, Rome Brass Co., Rome, N. Y.

John F. Beers, President, Beers Plating Works, Inc., Brooklyn, N. Y.

H. E. Willmore, one of the organizers and Secretary of the Crown Rheostat and Supply Co., Chicago.

John R. Neison, Chairman of the Board, Ajax Metal Co., Philadelphia.

Edwin L. Crosby, President, Detroit Electric Furnace Co., Detroit.

John C. Woodison, President, E. J. Woodison Co., Detroit.

Wm. H Bassett, Metallurgical Manager, American Brass Co., Waterbury.

William Fray, formerly Vice-president, National Cable and Conduit Co., Hastings, N. Y.

Ludwig Vogelstein, Chairman, American Metal Co., New York.

Franklin D. Williams, one of the owners of the Bay State Crucible Co. and a Director of the New England Brass Foundry, Taunton, Mass.

Charles R. Jacobs, Metallurgist, American Brass Co., Waterbury, Conn.

Elmer E. Arensberg, President, McCullough-Dalzell Co., Pittsburgh.

William A. Parker, President, Parker White Metal Co., Erie, Pa.

Henry Bergfels, Founder, Newark Nickel Plating Co., Newark, N. J.

Clyde A. Miller, Construction Superintendent, American Brass Co., Toronto.

Bradford H. Divine, President, Divine Brothers Co., Utica, N. Y.

Charles O. Bartlett, Founder, C. O. Bartlett & Snow Co., Cleveland.

Herbert J. Beck, Director, Assistant Treasurer and Factory Sales Manager, Aluminum Industries, Inc., Cincinnati.

Walter MacLeod, President, MacLeod Co., Cincinnati.

David R. Bowen, Vice-president, Farrel-Birmingham Co., Inc., Ansonia.

Industrial and Financial News

News of the Codes in the Metal Industries

Electro-Plating

The Supplementary Code Authority for the Electro-Plating, Metal Polishing and Metal Finishing Industry has made application to the National Industrial Recovery Board for approval of its budget for code administration, and of the proposed basis of contribution to the same by members of the industry.

The proposed budget is for the period from September 15, 1934 to June 15, 1935. It amounts to $57,450 divided as follows: Supplementary Code Authority $17,800; planning committee $1,650; district code committees $38,000. The basis of contribution is nine-twelfths (9/12) of one-half (½) of one per cent of the total cash volume of business done by each member company of the industry during the year 1933, as reported upon income tax returns for that year. The assessment is to be collected monthly in equal installments, or for any period in excess of monthly period, in advance, except that no member shall pay less than $3 per month, nor more than $35 per month.

The Code Authority also made application for termination of the exemption granted in Administrative Order X-36 of May 26, 1934 whereby members of its industry whose principal line of business is embraced in a trade or industry subject to a code other than that for this industry, were exempted from obligation to contribute to the expense of code administration for the electro-plating metal polishing and metal finishing industry.

The NRA has recognized the following District Code Committees.

District XII

F. J. Hanlon, Chicago City Plating Company; **R. J. Nicholson,** B. Mercil and Sons Plating Company; **James McVittie,** McVittie Plating and Brass Finishing Company; **H. E. Delevitt,** Keystone Plating Works; **C. J. Barry, Jr.,** Superior Plating Works; **Albert Young,** Triangle Auto Plating Works; **H. S. Sandberg,** Great Lakes Plating Company, all of Chicago.

District II

F. W. Carr, Panther Plating Company, Ft. Worth, Tex.; **J. P. Koley,** Koley Plating Company, Omaha; and **J. C. Cartwright,** Fargo Plating Company, Fargo, N. D.

District IX

Charles Schwartz, Quality Plating Works, Evansville, Ind.; **Ralph Stolle,** Stolle Corporation, Cincinnati; **N. H. McKay,** U. S. Chromium Company, Pittsburgh; **William Hohman,** Hohman Plating Company, Dayton, O.; **Fred Mootz,** Right Plating Co., Indianapolis.

District VII

Dr. Benjamin Freeman, National Chromium Company, New York City; **Walter Plumacher,** R. Plumacher & Sons, New York City; **Irving Berkman,** Berkman Brothers, Brooklyn, N. Y.; **A. L. Karet,** Keystone Chromium Corporation, New York City; **B. M. Katz,** Tillman Electro-Plating Company, New York City; **Louis E. Wisch,** Ever-Ready Plating Works, Brooklyn, N. Y.; and **E. F. Martini,** Presto Electro-Plating Company, New York City.

Fabricated Metal Products

The National Industrial Recovery Board has announced approval of the following members of the Code Authority:

H. S. Kimball, secretary-treasurer, Fabricated Metal Products Federation, Washington, D. C.; **L. D. Bement,** American Cutlery Manufacturers Association, Greenfield, Mass.; **G. B. Durell,** American Fork and Hoe Company, Cleveland; **W. D. Disston,** Henry Disston & Sons, Inc., Philadelphia; **A. M. Ferry,** Ferry & Dawson Wire Cloth Manufacturers Association, Washington; **D. S. Hunter,** D. S. Hunter & Associates, Cleveland; **H. D. North,** Ferry Cap & Set Screw Company, Cleveland; **A. E. Payson,** American Thermos Bottle Company, Norwich, Conn.; **R. W. Staud,** Porcelain Enamel Institute, Chicago; **W. M. Goss,** Scovill Manufacturing Company, Waterbury, Conn.; **A. J. Kieckhefer,** National Enameling & Stamping Company, Milwaukee, and **Lt. Col. C. C. Oakes,** War Department, Washington, Government representative.

Ingot Manufacturing

For the industry engaged in the smelting and refining of secondary metals into brass and bronze alloys in ingot form, **John Hopp,** consulting metallurgical engineer of Chicago has been appointed administration member of the Code Authority, to succeed Kern Gill, resigned.

Brass Forgings

The following members have been approved by the Administration as the Code Authority of the Brass Forging Manufacturing Industry, (a division of the Fabricated Metal Products Manufacturing Industry).

O. E. Von Au, Accurate Brass Company, Inc., Brooklyn, N. Y.; **E. R. Chase,** Chase Brass & Copper Company, Waterbury, Conn.; **H. B. Harvey,** The Harvey Metal Company, Chicago; **F. S. Hyde,** Scovill Manufacturing Company, Waterbury, Conn.; **T. W. Kuhn,** Bohn Aluminum & Brass Corporation, Detroit; **F. L. Riggin,** Mueller Brass Company, Port Huron, Mich.; **W. P. Sieg,** Titan Metal Manufacturing Company, Bellefonte, Pa.; **E. S. Wayland,** American Brass Company, Waterbury, Conn.; **G. F. R. Wheat,** Revere Copper & Brass Company, Inc., Rome, N. Y.; **C. C. Hirtzel,** The Electric Materials Company, North East, Pa.; and **B. S. Munsch,** The Atwater Manufacturing Company, Southington, Conn.

Jewelry Manufacturing

The National Industrial Recovery Board has ratified the action staying the Jewelry Code's restriction on manufacturing, soliciting, or accepting orders for fraternity emblems where the fraternity controls their manufacture and distribution under contract.

A clause in controversy is as follows:

"Where a fraternity controls the manufacture and distribution of its insignia under contract, it is an unfair trade practice for unauthorized persons to manufacture, solicit, or accept orders for such insignia."

In effect, the stay of the provision throws such business open to competitive bidding.

Powdered Metal Bearings

Approval of the supplementary Code of Fair Competition for the Powdered Metal Bearing Manufacturing industry was announced by the National Industrial Recovery Board.

The Code carries the same hours and wage provisions as the Master Automotive Parts and Equipment Code; basic 40-hour maximum work week and 40-cents-an-hour minimum wage rate.

Safety Razor and Safety Razor Blade

The Code Authority for the Safety Razor and Safety Razor Blade Manufacturing Industry has made application to the National Industrial Recovery Board for approval of its budget for, and of the basis of contribution by members of the industry to, the expense of administering the code for the period from August 1, 1934 to June 16, 1935.

The total amount of said budget for the said period is $20,534.50.

Industrial Wire Cloth Industry

The Industrial Wire Cloth Manufacturing Industry has submitted for NRA approval a plan to establish a governing body for its subdivision and has proposed a list of trade practice rules which would be applicable only to its branch of the Fabricated Metal Products Manufacturing and Metal Finishing and Metal Coating Industry.

The Wire Cloth Division is operating under the Basic Code, which permits divisions to adopt trade practice rules in addition to the regulations prescribed in the basic code.

Architectural Bronze

The NIRB has approved a Supplementary Code for the Architectural, Ornamental and Miscellaneous Iron, Bronze, Wire and Metal Specialties Manufacturing Industry, a division of the Fabricated Metal Products Manufacturing and metal finishing and metal coating industry. The supplementary code adopts the labor provisions of the basic code, forbids destructive price cutting, provides open price filing, and defines unfair trade practices.

Metal Spinning and Stamping

Approval of a supplement to the Fabricated Metal Products Manufacturing and Metal Finishing and Metal Coating Code providing for a "subdivisional committee" for the Metal Spinning and Stamping Manufacturing Division and establishing a group of trade practice rules to which divisional industry members will be subject in addition to the existing trade practice provisions in the Master Code has been announced.

Aluminum

The Code of the Aluminum Industry has been extended for an additional 45 days until February 19, 1935 to permit the National Industrial Recovery Board to study a report on the industry by the Division of Research and Planning.

Metal Developments

A new **galvanizing (zinc coating)** process has been reported from London as being in use on the European continent. It consists of a bath of molten lead, etc. on a special dividing liquid on top of which is a layer of pure zinc a few inches deep, insulated from the iron tank by a special lining. Articles to be zinc coated are pickled, rinsed, dipped in a hot saline solution, pre-heated and then put all the way down to the bottom, into the molten lead after which they are brought out through the zinc. Advantages claimed are absence of waste zinc, saving of time and fuel, a better coating and increased flexibility in the article.

According to a report in the daily press, the **Navy Department** will abandon the use of stainless steel in the construction of gasoline tanks. A test run on the aircraft carrier, Ranger, showed extraordinarily rapid corrosion of the gasoline tanks from the combination of salt water and gasoline. Stainless steel will be replaced by galvanized steel.

Pork sausages are now being wrapped in **metal foil** according to a statement of the **Reynolds Metals Company** of New York.

A piece of **oil filled copper cable** ¾ of a mile long, the longest of its kind ever made, was recently reeled in the **General Electric Company** at Schenectady, N. Y. The cable had a cross section of 450,000 circular mils, will be put into 132,000 volt operation, weighs 22 tons net, and has a shipping weight of 25 tons on its reel, which is 134" in diameter.

The **Washington Monument** in Washington, D. C., was recently equipped with platinum and gold tipped lightning rods for protection against the weather. A report dated December 27th states that thieves or souvenir hunters stole a considerable number of these lightning

rod points. A total of 170 will be installed.

A recent report in the press tells of a chemical meeting in London, at which it was stated that a **thin coating of selenium** on metals affords a better protection against a salt spray than any paint tried by the experimenters.

The **Bossert Corporation,** Utica, which makes parts for the automotive field reports a number of large orders for spring delivery which necessitates making a new set of tools. Officials of the corporation report their business decidedly better in all lines. This concern is one of Utica's largest metal factories.

A truck loaded with **scrap metal** valued at about $2,000 was held up and "hijacked" during the past month near White Plains, New York. The truck was owned by **Shapiro and Sons,** North Adams, Mass., and was headed for New Jersey.

A pronounced swing toward optimism is being shown by the metal industries of New England, according to **D. A. Nemser,** metallurgist of the development and research staff of the **International Nickel Company,** who spoke at a special meeting of the Boston Chapter of the American Society for Metals on Saturday, December 8th.

Coal companies are turning to the use of **trucks** with **aluminum bodies** for their hauling equipment, according to a report in the trade press.

A new **copper alloy cylinder head** for automobiles has been developed, which it is stated, brings about a decided reduction in fuel consumption and carbon accumulation.

The **vacuum process of die casting aluminum bronze,** it has been claimed, produces castings free from internal inclusion of aluminum oxide.

Exclusive jewelry stores throughout the country have put in a line of **copper kitchen utensils** as a part of their Christmas gift stock. **C. D. Dallas,** president of the **Revere Copper and Brass, Inc.,** stated that after sending to 3,000 jewelry stores a catalog of their new gift ware articles, they received more orders for tea kettles than for gift ware.

Nickel-clad steel is being used for soap boiling kettles by a Pacific Coast manufacturer.

One of the oustanding examples of **aluminum casting** work is the new **Navy and Marine Memorial** recently erected in Washington, a huge piece of statuary cast almost entirely of aluminum and finished by alumiliting. The completely assembled statue weighs approximately 10,000 pounds.

One of the earliest uses of **aluminum** was a State Dinner in 1855 by Napoleon. The more important guests were served with plates made of aluminum while the lesser dignitaries were forced to be content with plates of pure gold. At that time the price of aluminum was $27.00 a pound.

Durable **photographs on aluminum plates** have been reported by **Siemens & Halske,** Berlin, Germany.

A report states that British soldiers in the African desert are using **aluminum foil** as insulating material for their shelters to protect them from desert temperatures which run as high as 130°.

The public is cautioned in Circular Letter No. L. C. 263 of the **National Bureau of Standards,** that metallic paint on radiators reduces the radiating power by about 1/6th.

Bernard M. Baruch, head of the President's War Planning Board, in testifying before a hearing held by a Special Committee of the Foreign Affairs Committee of the House of Representatives in Washington, stated that the Government should buy tin and store it against war needs even though it would have to built up a reserve of tens of thousands of tons.

Rubber covering is being actively recommended to protect metal under highly corrosive conditions, such as exposure by exhaust fans in chemical plants, electroplating plants, etc.

The **American Society for Testing Materials** has developed plans for a systematic study of the outdoor atmospheric corrosion of galvanized wire and wire products in a wide variety of atmospheric conditions. Full details can be obtained from that Society at 260 S. Broad Street, Philadelphia, Pa.

Penn Galvanizing Company, 2200 E. Tioga Street, Philadelphia, Pa., reports that it is operating the largest galvanizing kettle in the United States. Its over-all dimensions are: length, 32' 6"; width 34"; depth 60". It holds 160 tons of molten zinc.

A quantity of **metal foil** almost sufficient to cover one entire side of the Empire State Building from pavement to tower has been obtained from the **Reynolds Metals Company,** 19 Rector Street, New York, for use in decorating the coming Automobile Show which will be held at the Grand Central Palace, 47th Street and Lexington Avenue, New York.

Home owners in the United States have during recent years paid approximately half a billion dollars a year for repair bills due entirely to rust, according to a statement from **Copper and Brass Research Association,** 25 Broadway, New York. This Association recommends the use of non-ferrous metals for parts subject to corrosion, like flashings, gutters, down spouts, water pipes, lighting fixtures, screens, etc.

An exhibition of **Contemporary Industrial Art** was held at the Metropolitan Museum of Art, 82nd Street and 5th Avenue, New York. There were 238 exhibitors from 51 cities in 9 states, and the exhibits totalled 750 in number. Among the products shown where lighting fixtures, hardware, metal moldings, doorways, silverware, clocks, metal furniture, brass and copper ware, metal doors, floor lamps, writing lamps, metal sash, tea services, flatware, hollow ware, display cases and reflectors.

A special exhibition of contemporary American craftwork was held at the gallery of **New York Society Craftsmen,** 43 E. 60th Street, which included exhibits of silver, jewelry and metal products of all kinds.

The Automobile Show

The Annual Automobile Show in New York, was held at the Grand Central Palace, New York, during the week of January 7-12. About 200 complete units were exhibited, representing 28 makes of passenger cars, several commercial vehicle exhibits and 50 accessories, equipment and special bodies.

No unusual developments in the use of new metals were visible. At the first glance it seemed that plated surfaces had been decreased because the radiators are largely painted or lacquered in color. The fact is, however, that by the increased use of radiator screens, the actual metallic surfaces are greater than ever. Moreover, these metallic surfaces are plated rather than being made of stainless steel.

The industry looks forward to a good year. If this is correct, it will carry metals and metal finishing along with it.

Season's Greetings

We acknowledge with thanks a number of friendly greetings and compliments of the season from our friends.

Business Feature Service, 1140 Merchandise Mart, Chicago, Ill.

George Gehling, 5001 Tulip Street, Philadelphia, Pa.

General Electric Company, Schenectady, N. Y.

Dr. A. K. Graham, University of Pennsylvania, Philadelphia, Pa.

Hendricks Brothers, Inc., 49 Cliff Street, New York.

Ernest Hinterlightner, Harshaw Chemical Company, Cleveland, Ohio.

George B. Hogaboom, Hanson-Van Winkle-Munning Company, Matawan, N. J.

C. M. Hoke, 22 Albany Street, N. Y.

Lea Manufacturing Company, 16 Cherry Street, Waterbury, Conn.

Matchless Metal Polish Company, Glen Ridge, N. J.

Metallurgical Products Company, 1227 E. Berks Street, Philadelphia, Pa.

Northern Blower Company, 6409 Barberton Avenue, Cleveland, O.

Benjamin Popper, Egyptian Lacquer Manufacturing Company, 90 West Street, New York.

Hedley Richards, Lasalco, Inc., 2838 La Salle Street, St. Louis, Mo.
Sulphur Products Company, Greensburg, Pa.
Tuttle Chemical Company, 245 7th Avenue, New York.
United Engineering & Foundry Company, Pittsburgh, Pa.
Weisberg and Greenwald, Inc., 71 W. 45th Street, New York.
West Virginia Pulp and Paper Company, 230 Park Avenue, New York.
Robert E. Wood, 810 18th Street, Washington, D. C.

National Power Show

The 11th annual Power Show was held at Grand Central Palace, New York, during the week of December 3rd. At this show were as usual, a large number of exhibits and exhibitors which use metal parts, special alloys, plated and finished metals of all descriptions in their products. There were also a number of companies directly engaged in the production of metal and alloy products, among which were the following:

American Brass Company, Waterbury, Conn. Everdur metal, and its manufactured forms; copper base alloys and their products of all descriptions.

American Metal Hose Company, Waterbury, Conn. Seamless brass metal tubing.

Chase Brass and Copper Company, Inc., Waterbury, Conn. Condenser tubes; Olympic bronze; brass and copper tubes and sweat fittings; copper base alloys and products of all descriptions.

Dole Valve Company, 1901 Carroll Avenue, Chicago, Ill. A synthetic solder with an aluminum base for patching and plugging boilers, pipes, etc.

The Foxboro Company, Foxboro, Mass. Recording instruments.

International Nickel Company, 67 Wall Street, New York. Nickel, nickel alloys and Monel metal and their products.

Molten Metallizing Corporation, 1209 Grand Street, Hoboken, N. J. Metal spraying equipment.

Scovill Manufacturing Company, Waterbury, Conn. Condenser tubing; copper base alloys and their products of all descriptions.

Chromium Versus "Stainless"

A hearing was held before the Federal Trade Commission in New York during the latter part of December, in which the American Stainless Company of Pittsburgh, Pa., stated a complaint against the National Silver Company of New York, for using the word "stainless" as a trade mark on its cutlery, which was made of carbon steel, chromium plated. It was the contention of the complainant that the word "stainless" in their advertising and general publicity had become synonymous in the minds of the public with chromium steels or nickel chromium steels; that chromium plate should not be trade marked stainless because of the resulting confusion.

It was the contention of the defendant that the word "stainless" could not be appropriated by any single product; that chromium plate was also stainless and that they also had the right to use the word.

The Federal Trade Commission is taking this case under advisement and will render its decision some time in the future.

Business Items-Verified

National Bearing Metals Corporation, 364-76 9th Street, Jersey City, N. J., manufacturer of bearing and other special metals, has purchased a two-story building, 100 x 150 ft. at 255-67 Brunswick Street, for expansion. The following departments are operated: bronze and brass foundry; brass machine shop, and casting shop.

S. W. Allen Company, 536 Mitchell Street, Orange, N. J., manufacturer of calculating machines and parts, has acquired a building across the street from its present location, and will occupy the new factory, which will give the company three times its present space. The following departments are operated: brazing, plating, polishing, grinding room, lacquering and japanning.

Chromium Corporation of America, announces extensive alterations and additions to their plant at 4645 W. Chicago Avenue, Chicago, Ill. A new modern building will add 10,000 square feet of additional floor space.

Illinois Watch Case Company, Dundee Avenue, Elgin, Ill., manufacturer of watch cases, watch mechanisms, etc., is considering a three-story section 30′ wide x 80′ long, to be added to the north wing of its factory.

Federated Metals Corporation, 75 Folsom Street, San Francisco, Calif., has awarded general contract for a three-story addition. Cost about $13,000 with equipment. The firm operates a smelting and refining department.

Dumore Company, Racine, Wis., have acquired a more spacious and modern factory building at 14th, Racine and Clark Streets. They are also purchasing new equipment for the manufacture of their line of fractional horsepower motors, grinders and electric appliances.

Joseph T. Ryerson and Son, Inc., 16th and Rockwell Streets, Chicago, Ill., have been appointed exclusive distributors of the Permite leaded bronze bearing stock in bar lengths up to 6 ft., diameters from ⅝″ to 2″ by sixteenths. The Permite line is made by Aluminum Industries, Inc., Cincinnati, Ohio.

Brown Instrument Company, Philadelphia, Pa., has been consolidated with the **Minneapolis-Honeywell Regulator Company,** Minneapolis, Minn. The Brown company will continue as a separate organization but as a subsidiary of the Minneapolis company. Research, development and engineering activities of these companies will be co-ordinated.

The **Worthington Company, Inc.,** Harrison, N. J., recently established a Pacific Coast regional headquarters at Los Angeles, 510 W. 6th Street.

General Bronze Company, L. I. City, N. Y., has asked for tenders at not exceeding 85 flat of not more than $1,500,000 of its ten-year 6% convertible debentures. John Polachek, chairman of board and president to withdraw from active participation in management on Nov. 30. E. H. Geiger, formerly senior vice-president to succeed Mr. Polachek.

Beam and Knodel, electroplating equipment and supplies, have moved from 199 Lafayette Street, to 195 Lafayette Street, New York, into considerably larger quarters. They report that business for 1934 was 75 per cent above 1933. H. F. Beam is president and treasurer; J. Knodel, secretary.

Paul W. Rhame, has been appointed assistant manufacturing manager, and **Sidney N. Lyttle,** chief inspector, of the **AC Spark Plug Co.,** Flint, Mich.

The **Meriam Company,** 1955 W. 112th Street, Cleveland, Ohio, reports business up on all fronts; in one department as high as 160 per cent. The company is one of the older manufacturers of instruments used in industrial operations such as manometers, flow meters, etc.

The New Jersey Zinc Sales Company, 160 Front Street, New York, has now purchased from the estate of **Ralph E. Potter,** who was associated with them for many years, the business and goodwill of **David Randall & Company,** and will continue this business in the name of The New Jersey Zinc Sales Company. Until further notice the Company will operate from the same Boston address, (55 Kilby Street) and through the same Boston warehouse, (the Albany Terminal Stores), with which customers are already familiar as a result of dealings with Mr. Potter and David Randall & Company in connection with their products. **George W. Harragan,** who, starting the early part of 1934, assisted Mr. Potter while the latter was ill, will continue as New England representative.

New Incorporations

Sodator Manufacturing and Sales Corporation, Bronx, N. Y., has been organized by Louis H. and Harry B. Stoller, 550 Trinity Avenue, Bronx, N. Y.; also George Walker and associates, to manufacture soda water and beverage-making machinery and parts, dispensing equipment, etc. The departments operated are tinning and soldering.

Marshalltown Plating Works, 702 S. 9th Avenue, Marshalltown, Iowa, was recently opened by E. G. Bruster and H. A. Dotterwich. Mr. Dotterwich will have charge of the plating. The plant will be equipped to replate all kinds of metals. The following departments are operated: soldering, plating, polishing and lacquering.

News From Metal Industry Correspondents

New England States

Waterbury, Connecticut

Jan. 2, 1935.

A survey of local brass industries indicates that for the past year as a whole, much more business was done and better profits made than in 1933. However, at no time during the year was there such a high peak as during the late summer of 1933. But the general average was better; business did not fall off so much during the latter part of 1934 as in the previous year, and the outlook at the beginning of this year is much better. Last year, at this time the trend was continuing downward from the high of August and September, while this year there has been a continuous upward movement since the latter part of September.

The Jewish boycott of German made goods is understood to have worked to the advantage of local plants. Many of the jobbers handling pins, metal novelties, etc. are Jews and are said to be refusing to handle such articles coming from Germany. In spite of the advance in electricity, there is still a good market for kerosene lamps and Jews in this country are reported to be refusing to buy those made in Germany. Many of the local plants make parts for kerosene lamps in large quantities and have for about 100 years.

Charles H. Granger, vice president of the **Waterbury Clock Company,** with officials of other clock manufacturers in this state, were in Washington last month to protest to the committee on reciprocity trade agreements against any downward revision of tariffs on watches and clocks. It is understood one proposal is to lower the tariffs against Swiss watches in return for Switzerland lowering its tariffs on electric refrigerators and other articles. The local officials declared that the Swiss have 50 per cent of the American watch market now and almost as much in Canada, Mexico and South America. American manufacturers cannot compete with them in other markets and consequently have to do practically all their business in this country. Lowering the tariff for the Swiss will ruin the local market, they said.

John A. Coe, president of the **American Brass Company,** was elected last month as one of the Connecticut directors of the **National Association of Manufacturers. William R. Webster** of the **Bridgeport Brass Company** is the other director from this state.

E. Roland Chase of the **Chase Companies, Inc.,** has been named to membership on the Code Authority for the Brass Forging Manufacturing Industry, the NRA has announced.

William M. Goss, secretary of the **Scovill Manufacturing Company** has been approved for membership on the Code Authority for the Fabricated Metal Products Manufacturing and Metal Finishing and Metal Coating Industry.

Part of the plant of the **American Mills Company** of this city, which has been idle for several years, has been leased to a local furniture concern for storage quarters. Part of the former plant of the **Ingersoll Watch Company,** later owned by the **Waterbury Clock Company,** has been leased to a trucking concern.

Patrick Pugliese of North Main street brought a claim for compensation against the **Chase Companies, Inc.,** on the ground that a skin eruption was caused by chemicals used in the factory but the compensation court turned down his claim on the ground that it was merely a form of eczema.

Alfred R. Wolff, member of a family long identified with the **Scovill Manufacturing Company,** was killed Dec. 20 in an explosion of the new Eldridge furnace at the plant, designed to cast tubes direct.

Edward L. Wolff, a cousin, and **Italo Marchetti,** repair man were injured in the same explosion.

Alfred Wolff was a son of the late **Lucien Wolff,** long an official of the company, and a nephew of **Adrian Wolff, Sr.,** who retired a few years ago after having served as master mechanic of the concern for many years.—W. R. B.

Connecticut Notes

Jan. 2, 1935.

HARTFORD—The **New England Regional Labor Board** has issued a finding to the effect that the **Colt's Fire Arms Company** has violated Section 7-A of the NIRA through failing to make either counter-offers or direct replies to the committee representing its employes and by its expressed unwillingness to enter into any agreement in any form with its employes through this committee. The board recommended that the company meet with the committee representing its employes, which it designated as officials of the Plastic Workers Union and Machinists Union with a view to entering into an agreement over wages, hours and working conditions or else the board would report it to the national labor board for action.

It is learned one member of the board did not sign the finding, holding that the company, while avoiding recognition of the unions mentioned as the bargaining agency of the workers, did not refuse to meet with its employes and did agree, to a considerable extent, to their demands.

NEW BRITAIN—Stanley Works reports a large volume of business in its mechanical erector toy sets, put on the market in 1933. Production this last year was 150 per cent ahead of 1933. The company has its own sales organization for handling the toys, called "Stanlo," and generally places its business direct with department stores.

The **Hart & Cooley Company** has sold two of its factory buildings in Nashua, N. H. to the **Bronze Craft Company** which is planning expansion.

MERIDEN—The **International Silver Company** has declared the usual dividend of $1 a share on preferred stock payable Jan. 1 to stock of record Dec. 10.

The company has brought suit against the **Derby-Shelton Silver Company,** alleging trademark infringement and asking for a permanent injunction. It claims it registered a trademark, described as **"Derby Silver Company** quadruple plate within a circle with crown and anchor," and that the **Derby-Shelton Company** is using a similar design on its packages and that the words, **"Derby-Shelton Silver Company"** leads persons to think they are buying the **Meriden Company** product.

The company is holding a pre-view of its Sales Service Institute exhibition in the building formerly occupied by the **Barbour Silver Company.** The exhibit covers 20,000 feet of floor space.

The **Manning, Bowman Company** now controlled by the **International Silver Company** is operating at the maximum schedule under the electrical manufacturing code and announces that after Jan. 1 it will operate 36 hours weekly. Unfilled orders exceed those on hand a year ago, according to **B. M. Tassie,** president. Electrical household and cooking devices are manufactured.

BRIDGEPORT—The **Remington Arms Company** will redeem on Jan. 2, at 101 and accrued interest, all the outstanding 6 per cent first mortgage sinking fund gold bonds, series A., due May 1, 1937. The amount outstanding is $3,700,000.

PLAINVILLE—The **Federal Cutlery Company** of Meriden has leased the Edward Hill factory here and, starting Jan. 2, will employ 150 persons.

The **Trumbull Electric Manufacturing Company** is observing its 35th anniversary this month. It announces that 54 per cent of its employes have been with the company from five to 10 years; 44 per cent from 10 to 20 years and 6½ per cent for over 20 years. **Former Gov. John Trumbull** is its president.

BRISTOL—The **Bristol Brass Corporation** last month declared a regular dividend of 25 cents and an extra dividend of 25 cents a share on the common stock, payable Dec. 15 on stock of record Nov. 30.

TORRINGTON—Torrington Company directors last month declared a dividend of $1 a share on the common stock payable Jan. 2 to stock of record Dec. 20.

STAMFORD—Yale & Towne Manufacturing Company has declared the regular dividend of 15 cents a share on the common, payable Jan. 2 on stock on record Dec. 10.—W. R. B.

Providence, R. I.

Jan. 2, 1935.

Much interest is being manifested in local industrial circles in connection with the State Apprenticeship Agency that has been created here by **Secretary** of **Labor Frances Perkins.** Eight members have been appointed to this Board whose province is to administer and regulate the employment of apprentices in industries operating under the NRA codes. The new body consists of State and Federal officials and representatives of industry and labor. It is set up under a special presidential order and is charged with the establishment of wage scales for apprentices and the regulation of conditions of employment for them. It will regulate also the proportion of apprentices to the total number of employes in any given plant.

The four men named as ex-officio members of the commission, under the provisions of the presidential order are: **Dr. Charles Carroll,** of Providence, State Director of Vocational Education; State Commissioner of Labor **Daniel F. McLaughlin;** State Director of the Federal Re-employment Service **Pierre de St. Aubin** and **L. Metcalf Walling,** representing the State NRA office. The other four members, appointed by the Secretary of Labor at the recommendation of the ex-officio members are: **George C. Rueckert,** president and treasurer of the **Rueckert Manufacturing Company,** jewelers, of this city; **Robert L. Anthony,** secretary of the textile manufacturing concern of **B. B. & R. Knight Corporation,** representing industry and **Peter McGeough,** a textile worker of Pawtucket and **Edward J. Foley,** a printer, Providence, representing labor.

Frank H. Fairbrother, who, for a number of years conducted an electroplating business in this city, died at the Jane Brown Hospital here on December 5, after a brief illness. He was born in Providence, October 31, 1885 and is survived by his widow.

Henry D. Sharpe, treasurer of the **Brown & Sharpe Manufacturing Company; Alfred K. Potter,** vice president and treasurer of the **Gorham Manufacturing Company; William C. Dart,** President of the **Rhode Island Tool Company; Frederick A. Ballou,** treasurer of the **B. A. Ballou & Company, Inc.** and **Frederick W. Easton,** President of the **Easton & Burnham Machine Company** were elected directors of the Rhode Island Hospital Trust Company at the annual meeting held December 11.

In accordance with the provisions of the General Laws of Rhode Island, Secretary of State Louis W. Cappelli has announced the list of corporations that have forfeited their charters by nonpayment of franchise taxes. Any of these corporations that directly or indirectly continue business are liable to a fine of from $50 to $1000. The following concerns are identified with the metal trades industries, the dates being those of the year of corporation: **William F. Almy Company,** Providence, 1925; **Annex Chromium Plating Company, Inc.,** Providence, 1930; **Apco Mossberg Corporation,** Providence, 1917; **Berberian Brothers, Inc.,** Providence, 1924; **Cutler Jewelry Company,** Providence, 1925; **O. C. Devereux Company,** Providence, 1903; **Fischer & Pruefer, Inc.,** Providence, 1926; **Hutchison & Huestis, Inc.,** Providence, 1911; **Lyons Manufacturing Company,** Providence, 1906; **Metal Craftsmen, Inc.,** Providence, 1927; **Pressed Metal Company,** Providence, 1923; **Rhode Island Grinding and Manufacturing Company,** Providence, 1920; **Rhode Island Metal Findings Company,** Providence, 1927; **Rhode Island Metal Products Company,** Providence, 1926; **Scullian Jewelry Company, Inc.,** Providence, 1927; **Supreme Manufacturing Company, Inc.,** 1926 and **The P. & J. Tierney Company,** Providence, 1901.

The **Anthony Bello Company, Inc.,** has been granted a charter under the laws of Rhode Island to conduct a manufacturing jewelry business at Providence with an authorized capital consisting of 100 shares of common stock of no par value. The incorporators are: **Anthony Bello, John Bello** and **Michael Bello** all of Providence.

The annual corporation meeting of the **Jewelers' Board of Trade** will be held at the rooms in the Turks Head Building, Providence, on Friday, January 25, at which reports will be presented and ten members of the Board of Directors elected. These directors will meet at a subsequent date and elect the administrative officers. Recently **Jared E. Allen** of the **Oneida Community, Ltd.** and **John M. Biggin** of the **Elgin National Watch Company** were elected directors to fill vacancies. President **Edwin H. Cummings** has appointed the following committee to present nominations for the ten directors at the annual meeting: **Edgar R. Baker** of the **W. R. Cobb Company,** chairman; **Howard L. Carpenter** of the **Albert Walker Company,** Providence; **Sigmund Cohn** of New York, **Frederick B. White** of the **J. J. White Manufacturing Company,** Providence and **Raymond Wells** of the **Wells Manufacturing Company.**

Henry B. Wright, Providence refiner on Sabin street, who has been in a local hospital under treatment for several weeks, died Dec. 16 aged 66 years.

—W. H. W.

Middle Atlantic States

Utica, N. Y.

January 2, 1935

Metal factories in Central New York are gradually and surely pulling themselves out of the depression with a steady improvement shown throughout 1934 and anticipation of better business in 1935 according to **John Strain,** Executive Secretary, Utica Industrial Association, who from a survey made in this area is optimistic over the outlook in the metal field for 1935.

"The gain in metals," he said, "has not been startling or radical but during the past year it has been steady and certain and there is every reason to believe it will continue on the upgrade during 1935."

The **American Emblem Company** in Utica has had the best December in five years with the factory working night and day to fill the holiday orders.

The concern made thousands of cocktail cups from brass, plated with chromium. Premiums given away through the Richfield Oil radio program were another large item. The company is continuing making its line of radio escutcheons.

Night shifts were worked at the **Rome Manufacturing Company,** division of the **Revere Copper & Brass, Inc.,** Rome, to get out the holiday orders. The company puts out a novelty line in addition to its regular staple articles. The **Rome Turney Radiator Company** has been active lately with a brisk business reported. **William Lynch** is president. The company manufactured part of the equipment for the Burlington "Zephyr."

Prospects are bright for resumption of dividend payments on the preferred stock in **Remington Rand** of Ilion, after the start of its fiscal year April 1.

Louis P. Diss, Ilion, N. Y., inventor, died Christmas day at his home in his 89th year. Native of Gedweiller, Alsace, France, he perfected many inventions valuable to the gun and typewriter trade. One of his inventions made practical the old Lee military rifle which was used by the English and American forces during the World War. Later he was superintendent of the **Hammond Typewriter Company** and then superintendent of the **Remington Typewriter Company.** In the latter post he improved the typewriter and made improvements in production methods. One invention alone, the aligning fixture, has saved millions in production, men in the industry claim.

E. K. B.

Newark, N. J.

Jan. 2, 1935.

The **Mueck-Cary Company, Inc.,** which was recently formed, has erected a factory at Bound Brook for the manufacture of Sterling sliver holloware. The concern has had special machinery made and will employ skilled workers. The corporation will manufacture lines formerly made and marketed by **A. J. Mueck,** of Watchung, and by the **Acme Sterling Corporation** of Meriden, Conn. The patterns, stock and fixtures of the two concerns have been purchased by the new company. **Floyd F. Cary,** of Fairhaven, Mass., is associated with **A. J. Mueck.**

The following Newark concerns have been incorporated; **Arch Crown Ring & Jewelry Company,** $125,000, jewelry; **Bering Company,** metal products, 100 shares no par; **H. & H. Chemical Company,** chemicals, 2,500 shares no par.

—C. A. L.

Trenton, N. J.

Jan. 2, 1935.

The plant of the **Capitol Welding Company,** 138-140 Lamberton Street, was destroyed by flames early in December, ruining a new machine valued at $2,400. The blaze was due to an acetylene torch igniting gasoline which was being carried into the building. One man was painfully burned.

The **John A. Roebling's Sons Company** is having a warehouse erected at the Hancock Street plant. The structure will be one story, brick and steel.

The **New Jersey Department of Labor** reports that there was a slight increase in employment in manufacturing plants during the fall months.

The following concerns have been incorporated here; **Kelley Metal Lath Company,** Clifton, $100,000; **Zinc-O-Type, Inc.,** metal products, Caldwell, 500 shares no par; **E. S. E. Electrical Products, Inc.,** electrical devices, East Orange, 1,000 shares no par; **Ampere Products Company,** chemicals, West Orange, 1,000 shares no par; **Rentschler & Sons, Inc.,** metal products, Irvington, 1,000 shares no par; **Standard Metallizing, Inc.,** tanks and pipe lines, Jersey City, 200 shares no par.—C. A. L.

Middle Western States

Detroit, Mich.

Jan. 2, 1935.

All branches of the non-ferrous metal industry are closing a more or less hectic year, but are about to enter the next 12 months with favorable prospects and much optimism.

The motor car industry, always referred to as an industrial barometer in this area, has the most promising outlook in more than two years. The new models soon to be shown are said to be outstanding for both utility and appearance. All of the big plants are prepared for increased production and have spent vast sums for retooling and other preparations.

The plating industry also is showing signs of reviving. This is so closely allied with the motor car that it practically has the same outlook. Most of these plants already are active and will be on increased production soon after the first of the year.

Manufacturers of refrigeration units still are going strong. This industry has been active for months, and has still greater prospects with air conditioning becoming more general.

Not much change is noted for the better in the production of plumbers' and steamfitters' supplies. Manufacturing jewelers also are quiet.

The **Hall Lamp Company** is making progress and reports a substantial increase in operations. Prospects for 1935 are good with a Dodge contract having been added. This company is making lamps for all Chrysler units, except Plymouth, and for Packard, Graham-Paige, Hupp, Terraplane and Lincoln cars.

The **Kelvinator Corporation,** it is announced, is planning for the erection of 80 residences in the neighborhood of its plant in order to meet requirements of its employes.

The feature of the Ford exhibition of the **1934 Century of Progress**—a huge rotunda of the main building—is to be rebuilt as a visitors' entrance to the River Rouge plant of the **Ford Motor Company.** The site is a plot of ground covering 13 acres along Coolidge Highway and opposite the administration building.

Edmund J. Haines, 56, metallurgist for the Ford Motor Company, died recently from injuries suffered when his automobile was struck by a train at a grade crossing in Detroit. He was associated with Mr. Ford while the latter was building some of his first cars. Mr. Haines was born in London, Ont., and is survived by a son, two brothers and five sisters.—F. J. H.

Toledo, Ohio

Jan. 2, 1935.

This area is closing the old year with a more favorable outlook than it has experienced in the last three years or more. Late fall began to show signs of changes for the better, and while they slowed up for the holiday period, industrial leaders are ready for the start expected soon after the new year has become established.

As might be expected, the motor car industry is the barometer on which every one in this area bases his forecasts. Nothing but clear skies are showing for January. Accessory plants already are getting under way and will increase production as the new year continues to advance.

A good run of business in other lines where brass, copper and aluminum are involved, seem assured. The plating plants also are preparing for increased operations.

Frigidaire Corporation has retooled its plant at Dayton, O., and installed new machinery at a cost of $1,600,000, according to **E. G. Biechler,** president and general manager. This investment, he said, was made in anticipation of greater sales volume during the coming year and represents one of the most substantial sums spent in improvement since 1929.

The plant of the **American Stove Company** at Lorain, Ohio, will re-open shortly after the first of the year, it is announced. It is understood that from $75,000 to $100,000 will be spent in preparation for the start. It is expected about 300 men will be given employment.—F. J. H.

Pacific States

Los Angeles, Calif.

Jan. 2, 1935.

Engineers here now are working on the idea of building factories and other buildings, mostly of steel, no windows, acoustical material in the ceiling, office partitions of steel and glass, tile for decoration and also bronze, brass and aluminum, air conditioned by a central station, with distributing ducts, cooled and dehumidified in summer, heated and humidified in winter. All air is washed and filtered; will have compressors in basement, using cooling apparatus, have automatic thermostatic control to add to or have less heat, air or cooling.

Antoine Gazda an Austrian inventor was in Los Angeles recently. He has invented a secret process for making an extremely light alloy, involving beryllium and declared bullet proof against machine guns. It is 70 per cent lighter than steel.

The **General Aviation Manufacturing Corporation,** a subsidiary of General Motors Corp., have plans made and expect to go ahead with the building of a $1,000,000 factory to employ 1000 hands. It would be for airplanes.

The **United Verde Copper Company** of Clarksdale, Ariz., have got up a new idea, using copper paint for the sides and bottom of swimming pools, which kills the algae. It has been tried and proved successful, also to put some copper beneath the regular filtering sand.

The **Fairbanks-Morse Company** of Santa Fe Av. here, will make air conditioning equipment and a new type of refrigerator. The main factory is at 900 South Wabash Ave., Chicago.

Robert Weber of Escondido will make galvanized corrugated sheet metal, to put around the tree and roots, to protect them from rats, mice, rabbits, gophers and squirrels.

The **Don-on-ation Company** of 793 East 17th St., are making machinery for the pre-cooling of fruits and vegetables before shipment.—H. S.

The North Pacific

Jan. 2, 1935.

The world's first all electric city is being built at the Coulee Dam in Washington, known as Mason City, for employes and families, on the Columbia River. It will have a population of 5,000 to 10,000 people. There will not be even one chimney or smokestack, although the temperature in the winter sometimes goes as low as 20 to 29 degrees below zero.

The **Bohn Aluminum & Brass Company** of Detroit, are dickering with the Government at Washington to get power from the Bonneville Dam, in Washington State and if they do get it, plan to establish an aluminum plant.

The **Simmons Company,** of New York City, large manufacturers of box springs and metal parts for beds, are now establishing another plant at Seattle, Wash.—H. S.

Metal Market Review

January 2, 1935

December was on the whole a good month, most of the metals being either firm or strong.

Copper prices remained the same, 9c. for Blue Eagle, but the underlying conditions improved considerably. Blue Eagle bookings for December rose to 18,000 tons, well above the November figures. Statistics showed that copper stocks decreased 37,000,000 pounds during November in North and South America. Heavy buying took place from abroad, Japan being a prominent factor. The foreign producers of copper will meet in the United States January 15th, to try once more to stabilize the industry by working out agreements for production quotas.

Zinc was firm, beginning at 3.70 and closing at 3.725 for Prime Western. Total sales in November of Prime Western and Brass Special by the thirteen smelters who send in returns to the American Zinc Institute, amounted to 18,527 tons in November compared with 19,580 in October and 7,116 tons in September. Sales of zinc in November 1933 were 9,885 tons.

Tin was rather dull with prices almost static, varying from 50.70 to 51.05, ending the month at 50.775.

Apparent consumption of tin in the United States dropped from 57,950 tons in 1933 to 42,769 tons in 1934. Actually, the total tin used in the United States was 57,370 tons. Tin used in bearing metals increased to 3,280 tons (13½%); tin used in solder increased to 8,710 tons (36%).

Lead was quite strong, rising from 3.35 to 3.55. According to trade reports, December metal is now largely sold and fairly heavy January bookings are reported. Stocks of lead in the United States increased 2,650 tons in November. Production totaled 34,425 tons in November against 35,576 tons in October.

Aluminum was unchanged at 22 cents.

Nickel was unchanged at 35 cents. A recent statement from the International Nickel Company (page 5 of this issue) shows that in 1934 the demand for nickel throughout the world increased 32 per cent.

Antimony was fairly firm, beginning the month at 14, slipping to 13.75 and closing at 13.875.

Silver was also firm at good levels. It began December at 54.875, went as low as 53.50 and closed at 54.75.

The United States produced 1,976,000 oz. in November of the current year, against 2,099,000 oz. in October. Output of the United States in the eleven month's period totaled 23,524,000 oz., the American Bureau of Metal Statistics estimates, which compares with 19,393,000 oz. in the same period the year previous.

Platinum and **Gold** was unchanged at $34.00 and $35.00 per ounce respectively.

Scrap metals were fairly strong and active. A steady demand for copper scrap has been reported from New England and also continued strength and activity in aluminum. Copper refiners edged up their prices.

The Code Authority for the Non-Ferrous Scrap Metal Trade has presented a brief to the NRA describing the "unfair situation in connection with the purchase of scrap by the custom copper smelters who are operating under the Code of the copper industry."

The Code Authority of the Ingot Brass and Bronze Industry reports shipments and deliveries of Ingot Brass and Bronze made during the calendar month of October, 1934, amounted to 4,106 net tons; November, 3,919 tons.

Average prices per pound on Commercial Grades of six principal mixtures of Ingot Brass during the twenty-eight day period ending November 30:

Commercial 80-10-10 (1½% Impurities)	9.864c.
Commercial 78% Metal	7.549c.
Commercial 81% Metal	7.750c.
Commercial 83% Metal	8.017c.
Commercial 85-5-5-5	8.278c.
Commercial No. 1 Yellow Brass Ingot	6.535c.

WROUGHT METAL MARKET

Copper and copper alloy fabricators who have gone into the manufacture of consumer goods, such as copper ware, gift ware, etc., have had one of the best Fall seasons in recent years. In general, however, December was a typical end-of-the-year period, being dull to fair in various localities. The total volume of business in the copper and brass industry in 1934 was about 10% ahead of 1933, according to B. B. Caddle, secretary of the Copper & Brass Research Association; the outlook for 1935 is encouraging.

Recently released figures from the Census Bureau on Nonferrous Metal Alloys and Products are interesting.

The total value of products made by establishments engaged primarily in the manufacture of non-ferrous metal alloys and products in 1933 amounted to $239,155,936 (at f.o.b. factory prices), as against $331,438,974 reported for 1931 and $909,804,050 for 1929. The rates of decrease for the two biennial periods are: 1931-1933, 27.8 per cent; 1929-1931, 63.6 per cent. The principal items contributing to the 1933 total are: plates and sheets, $58,524,377; rods, $31,095,824; tubing and pipe, $23,901,960; ingots and pigs, $18,991,184; rough castings, $21,692,912.

Daily Metal Prices for December, 1934

Record of Daily, Highest, Lowest and Average Prices and the Customs Duties

	3	4	5	6	7	10	11	12	13	14	17	18
Copper c/lb. Duty 4 c/lb.												
Lake‡ (del. Conn. Producers' Prices)	9.125	9.125	9.125	9.125	9.125	9.125	9.125	9.125	9.125	9.125	9.125	9.125
Electrolytic‡ (del. Conn. Producers' Prices)	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Casting (f.o.b. ref.)	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25	7.25
Zinc (f.o.b. East St. Louis) c/lb. Duty 1¼ c/lb.												
Prime Western (for Brass Special add 0.05)	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.70	3.725	3.75
Tin (f.o.b. N. Y.) c/lb. Duty Free, Straits	50.95	50.875	50.90	51.05	50.90	51.00	51.00	50.90	50.85	50.925	50.825	50.925
Lead (f.o.b St. L.) c/lb. Duty 2½ c/lb.	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.35	3.45	3.55	3.55
Aluminum c/lb. Duty 4 c/lb.	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00	22.00
Nickel c/lb. Duty 3 c/lb.												
Electrolytic 99.9%	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Antimony (Ch.99%) c/lb. Duty 2 c/lb.	14.00	14.00	14.00	13.875	13.875	13.875	13.875	13.875	13.875	13.875	13.875	13.75
Silver c/oz. Troy, Duty Free	54.875	54.875	54.875	55.00	54.75	54.75	54.875	54.75	54.625	54.625	54.25	53.75
Platinum $/oz. Troy, Duty Free	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00	34.00
Gold—Official Price[1] $/oz. Troy	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00	35.00

	19	20	21	24	25*	26	27	28	31	High	Low	Aver.
Copper c/lb. Duty 4 c/lb.												
Lake‡ (del. Conn. Producers' Prices)	9.125	9.125	9.125	9.125	....	9.125	9.125	9.125	9.125	9.125	9.125	9.125
Electrolytic‡ (del. Conn. Producers' Prices)	9.00	9.00	9.00	9.00	....	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Casting (f.o.b. ref.)	7.50	7.50	7.50	7.50	....	7.50	7.50	7.50	7.50	7.50	7.25	7.35
Zinc (f.o.b. East St. Louis) c/lb. Duty 1¼ c/lb.												
Prime Western (for Brass Special add 0.05)	3.75	3.725	3.725	3.725	....	3.725	3.725	3.725	3.725	3.75	3.70	3.714
Tin (f.o.b. N. Y.) c/lb. Duty Free, Straits	50.85	50.80	50.80	50.80	....	50.80	50.80	50.70	50.775	51.05	50.70	50.871
Lead (f.o.b St. L.) c/lb. Duty 2½ c/lb.	3.55	3.55	3.55	3.55	....	3.55	3.55	3.55	3.55	3.55	3.35	3.454
Aluminum c/lb. Duty 4 c/lb.	22.00	22.00	22.00	22.00	....	22.00	22.00	22.00	22.00	22.00	22.00	22.00
Nickel c/lb. Duty 3 c/lb.												
Electrolytic 99.9%	35.00	35.00	35.00	35.00	....	35.00	35.00	35.00	35.00	35.00	35.00	35.00
Antimony (Ch.99%) c/lb. Duty 2 c/lb.	13.75	13.75	13.75	13.75	....	13.75	13.875	13.875	13.875	14.00	13.75	13.812
Silver c/oz. Troy, Duty Free	53.875	54.125	53.25	53.50	....	53.50	53.875	54.375	54.75	55.00	53.25	54.390
Platinum $/oz. Troy, Duty Free	34.00	34.00	34.00	34.00	....	34.00	34.00	34.00	34.00	34.00	34.00	34.00
Gold—Official Price[1] $/oz. Troy	35.00	35.00	35.00	35.00	....	35.00	35.00	35.00	35.00	35.00	35.00	35.00

*Holiday. ‡Blue Eagle.

Metal Prices, January 4, 1935

(Import duties and taxes under U. S. Tariff Act of 1930, and Revenue Act of 1932)

NEW METALS

Copper: Lake, 9.125, Electrolytic 9.00, Casting, 7.50. **Zinc:** Prime Western, 3.725. Brass Special, 3.825. **Tin:** Straits, 50.70. Pig 99%, 49.80. **Lead:** 3.55. **Aluminum,** 22.00. **Antimony,** 13.875. **Nickel: Shot, 36. Elec., 35.**

Quicksilver: Flasks, 75 lbs., $73.00. **Bismuth,** $1.10. **Cadmium,** 55. **Silver,** Troy oz., official price, N. Y., Jan. 15, 54.25c. **Gold:** Oz., Troy, Official U. S. Treasury price Jan. 15, $35.00. **Scrap Gold,** 6¾c. per pennyweight per karat, dealers' quotation. **Platinum,** oz Troy, $33.00.

Duties: Copper, 4c. lb.; zinc, 1¼c. lb.; tin, free, lead, 2½c. lb.; aluminum, 4c. lb.; antimony, 2c. lb.; nickel, 3c. lb.; quicksilver, 25c. lb.; bismuth, 7½%; cadmium, 15c. lb.; cobalt, free; silver, free; gold, free; platinum, free.

INGOT METALS AND ALLOYS

	Cents lb.	U. S. Import Duty	Tax*
Brass Ingots, Yellow	6½ to 8	None	4c. lb.[1]
Brass Ingots, Red	8¼ to 11	do	do
Bronze Ingots	9¾ to 12½	do	do
Aluminum Casting Alloys	15½ to 22	4c. lb.	None
Manganese Bronze Castings	20 to 34	45% a. v.	3c. lb.[2]
Manganese Bronze Forgings	26 to 38	do	do
Manganese Bronze Ingots	9 to 13	do	4c. lb.[1]
Manganese Copper, 30%	11½ to 16	25% a. v.	3c. lb.[2]
Monel Metal Shot or Block	28	do	None
Phosphor Bronze Ingots	10 to 12	None	4c. lb.[1]
Phosphor Copper, guaranteed 15%	13¼ to 15	3c. lb.[2]	do
Phosphor Copper, guaranteed 10%	11½ to 14	do	do
Phosphor Tin, no guarantee	61 to 75	None	None
Silicon Copper, 10%	18 to 30	45% a. v.	4c. lb.[1]
Iridium Platinum, 5%	$35-36.50	None	None
Iridium Platinum, 10%	$36-37.50	None	None

*Duty is under U. S. Tariff Act of 1930; tax under Section 60 (7) of Revenue Act of 1932.
[1]On copper content. [2]On total weight. "a. v." means ad valorem.

OLD METALS

Dealers' buying prices, wholesale quantities:

	Cents lb.	Duty	U. S. Import Tax
Heavy copper and wire, mixed	6¾ to 6⅝	Free	4c. per pound on copper content.
Light copper	5½ to 5¾	Free	
Heavy yellow brass	3⅜ to 3⅝	Free	
Light brass	3 to 3⅛	Free	
No. 1 composition	4⅞ to 5⅛	Free	
Composition turnings	4⅝ to 4⅞	Free	
Heavy soft lead	3 to 3¼	2⅛c.lb.	None.
Old zinc	2¼ to 2⅜	1½c.lb.	
New zinc clips	2¾ to 3	1½c.lb.	
Aluminum clips (new, soft)	12¼ to 13¼	4c.lb.	
Scrap aluminum, cast	9¼ to 10	4c.lb.	
Aluminum borings—turnings	5 to 5½	4c.lb.	
No. 1 pewter	30 to 32	Free	
Electrotype or stereotype	2⅞ to 3	2½c. lb.*	
Nickel anodes	30 to 33	10%	
Nickel clips, new	31 to 33	10%	
Monel scrap	11 to 18½	10% a.v.	

*On lead content.

Wrought Metals and Alloys

The following are net BASE PRICES per pound, to which must be added extras for size, shape, quantity, packing, etc., or discounts, as shown in manufacturers' price lists, effective since November 24, 1934. Basic quantities on most rolled or drawn brass and bronze items below are from 2,000 to 5,000 pounds; on nickel silver, from 1,000 to 2,000 pounds.

COPPER MATERIAL

	Net base per lb.	Duty*
Sheet, hot rolled	16c.	2½c. lb.
Bare wire, soft, less than carloads	12.75c.	25% a. v.
Seamless tubing	16.25c.	7c. lb.

*Each of the above subject to import tax of 4c. lb. in addition to duty, under Revenue Act of 1932.

NICKEL SILVER

Net base prices per lb. (Duty 30% ad valorem.)

Sheet Metal		Wire and Rod	
10% Quality	23.50c.	10% Quality	26.375c.
15% Quality	25.625c.	15% Quality	30.75c.
18% Quality	26.875c.	18% Quality	34.00c.

BRASS AND BRONZE MATERIAL

	Yellow Brass	Red Brass 80%	Comm'l. Bronze	Duty	
Sheet	14¼c.	15¼c.	16	4c. lb.	U. S. Import Tax
Wire	14¾c.	15¾c.	16½	25%	
Rod	12¾c.	15¾c.	16⅜	4c. lb.	4c. lb. on copper content
Angles, channels	22¼c.	23½c.	24	12c. lb.	
Seamless tubing	16 c.	16¾c.	17⅝	8c. lb.	
Open seam tubing	22¼c.	23½c.	24	20% a. v.	No tax.

TOBIN BRONZE AND MUNTZ METAL

(Duty 4c. lb.; import tax 4c. lb. on copper content.)

Net base prices per pound.	
Tobin Bronze Rod	16¼c.
Muntz or Yellow Rectangular and other sheathing	17⅜c.
Muntz or Yellow Metal Rod	13¾c.

ALUMINUM SHEET AND COIL

(Duty 7c. per lb.)

Aluminum sheet, 18 ga., base, ton lots, per lb.	32.80
Aluminum coils, 24 ga., base price, tons lots, per lb.	30.50

ROLLED NICKEL SHEET AND ROD

Duty 25% ad valorem, plus 10% if cold worked.)

Net Base Prices

Cold Drawn Rods	50c.	Cold Rolled Sheet	60c.
Hot Rolled Rods	45c.	Full Finished Sheet	52c.

MONEL METAL SHEET AND ROD

Duty 25% ad valorem, plus 10% if cold worked.)

Hot Rolled Rods (base)	35	Full Finished Sheets (base)	42
Cold Drawn Rods (base)	40	Cold Rolled Sheets (base)	50

SILVER SHEET

Rolled sterling silver (Jan. 15) 55¾c. per Troy oz. upward according to quantity. (Duty, 65% ad valorem.)

ZINC AND LEAD SHEET

	Cents per lb. Net Base	Duty
Zinc sheet, carload lots, standard sizes and gauges, at mill, less 7 per cent discount	9.50	2c. lb.
Zinc sheet, 1200 lb. lots (jobbers' price)	10.25	2c. lb.
Zinc sheet, 100 lb. lots (jobbers' price)	14.25	2c. lb.
Full Lead Sheet (base price)	7.00	2⅜c. lb.
Cut Lead Sheet (base price)	7.25	2⅜c. lb.

BLOCK TIN, PEWTER AND BRITANNIA SHEET

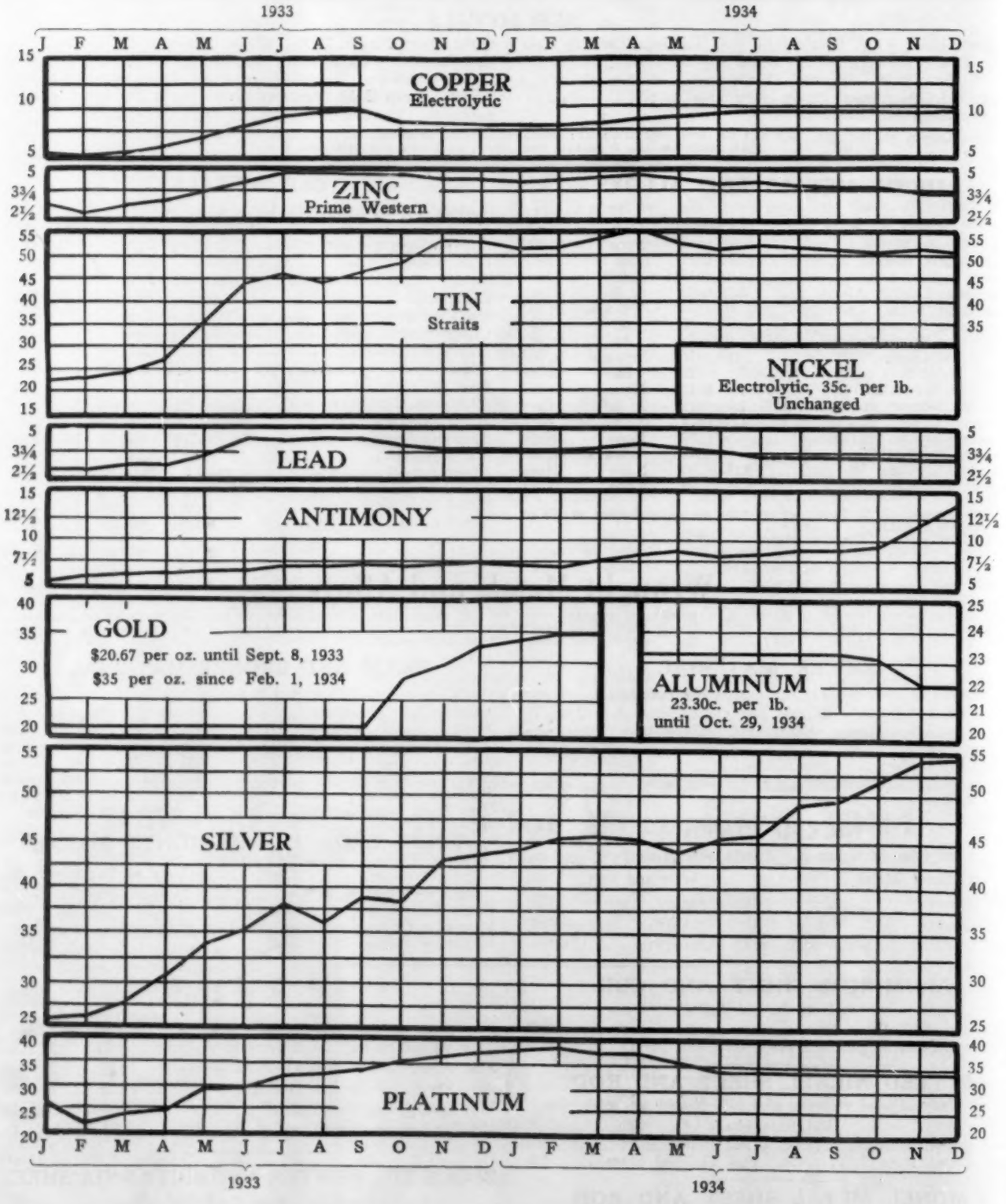
(Duty Free)

This list applies to either block tin or No. 1 Brittannia Metal Sheet, No. 23 B. & S. Gauge, 18 inches wide or less; prices are all f. o. b. mill:

500 lbs. or over	15c. above N. Y. pig tin price
100 to 500 lbs.	17c. above N. Y. pig tin price
Up to 100 lbs.	25c. above N. Y. pig tin price
Up to 100 lbs.	25c. above N. Y. pig tin price

Supply Prices on page 44.

Chart of Metal Prices for 1933-1934



NOTE:—Prices shown on left and right edges of chart are in cents per pound, except for silver which is in cents per Troy ounce, and gold and platinum which are in dollars per Troy ounce.

Supply Prices—Page 44

Pig Iron and Metal Production of the United States

Calendar Years 1925-1933. (1934 Estimated)

(FIGURES THROUGH 1933 FROM THE UNITED STATES BUREAU OF MINES)

PRODUCTS METALLIC	1925 Quantity	1925 Value	1926 Quantity	1926 Value	1927 Quantity	1927 Value	Products
Pig iron (spot value), long tons	36,814,702	$739,316,333	38,181,053	$749,633,468	34,866,644	$646,226,139	Pig iron
Copper, sales value, pounds	1,674,869,886	237,832,000	1,739,622,094	243,547,000	1,684,040,983	220,609,000	Copper
Zinc, sales value, short tons	555,631	84,456,000	611,991	91,799,000	576,960	73,851,000	Zinc
Tin, short tons	14	15,980	8	10,400	27	34,600	Tin
Lead (ref.) sales value, short tons	654,921	113,956,000	680,685	108,910,000	668,320	84,208,000	Lead
Aluminum, pounds	140,000,000	36,430,000	145,000,000	37,583,000	160,000,000	39,266,000	Aluminum
Nickel, value at New York, short tons	272	169,664	323	234,558	860	390,740	Nickel
Quicksilver, value at N. Y., flasks (e)	9,174	762,616	7,642	702,323	11,276	1,314,782	Quicksilver
Silver, commercial value, troy ounces.	66,155,424	45,911,864	62,718,746	39,136,497	60,434,441	34,266,328	Silver
Gold, coining value, troy ounces	2,411,987	49,860,200	2,335,042	48,269,600	2,197,125	45,418,600	Gold
Platinum and allied metals, value at New York City, in troy ounces	49,643	5,661,809	84,981	9,210,669	46,050	3,780,216	Platinum
Total value of metallic products (approximate) (b)		$1,380,280,000		$1,402,920,000		$1,217,000,000	

PRODUCTS METALLIC	1928 Quantity	1928 Value	1929 Quantity	1929 Value	1930 Quantity	1930 Value	Products
Pig iron (spot value), long tons	38,303,699	$661,351,270	41,549,161	$731,858,075	29,905,355	$512,165,131	Pig iron
Copper, sales value, pounds	1,825,900,393	262,930,000	2,002,863,135	352,504,000	1,394,389,327	181,271,000	Copper
Zinc, sales value, short tons	591,525	72,166,000	612,136	80,802,000	489,361	46,979,000	Zinc
Tin, short tons	47	47,400	39	35,600	17	10,500	Tin
Lead (ref.) sales value, short tons	626,202	72,639,000	672,498	84,735,000	573,740	57,374,000	Lead
Aluminum, pounds	210,000,000	47,899,000	225,000,000	51,864,000	229,035,000	50,961,000	Aluminum
Nickel, value at New York, short tons	522	291,836	340	297,273	308	213,803	Nickel
Quicksilver, value at N. Y., flasks (e)	17,870	2,207,003	23,682	2,892,638	21,533	2,478,789	Quicksilver
Silver, commercial value, troy ounces.	58,462,507	34,200,567	61,327,868	32,687,754	50,748,127	19,538,029	Silver
Gold, coining value, troy ounces	2,233,251	46,165,400	2,208,386	45,651,400	2,285,603	47,247,600	Gold
Platinum and allied metals, value at New York City, in troy ounces	59,039	4,692,786	47,977	3,121,471	43,502	2,048,824	Platinum
Total value of metallic products (approximate) (b)		$1,284,580,000		$1,475,990,000		$982,550,000	

PRODUCTS METALLIC	1931 Quantity	1931 Value	1932 Quantity	1932 Value	1933 Quantity	1933 Value	Products
Pig iron (spot value), long tons	17,912,579	$285,147,156	8,518,400	$126,032,714	14,353,197	$213,347,583	Pig iron
Copper, sales value, pounds	1,042,711,178	94,887,000	544,009,948	34,273,000	449,999,143	28,800,000	Copper
Zinc, sales value, short tons	291,996	22,192,000	207,148	12,429,000	306,010	25,705,000	Zinc
Tin, short tons	4.1	2.050	0.5	220	2.7	2,100	Tin
Lead (ref.) sales value, short tons	390,260	28,879,000	255,337	15,320,000	259,616	19,212,000	Lead
Aluminum, pounds	177,544,000	37,284,000	104,885,000	20,453,000	85,126,000	16,174,000	Aluminum
Nickel, value at New York, short tons	373	202,406	195	88,515	126	62,913	Nickel
Quicksilver, value at N. Y., flasks (e)	24,947	2,179,145	12,622	731,129	9,402	556,852	Quicksilver
Silver, commercial value, troy ounces.	30,932,050	8,970,294	23,980,773	6,762,578	23,002,629	8,050,920§	Silver
Gold, coining value, troy ounces	2,395,878	49,527,200	2,449,032	50,626,000	2,556,246	52,842,300‡	Gold
Platinum and allied metals, value at New York City, in troy ounces	36,205	1,274,029	17,616	592,000	51,539	1,631,000	Platinum
Total value of metallic products (approximate) (b)		$567,200,000		$283,700,000			

ESTIMATES OF UNITED STATES PRODUCTION FOR 1934

	Quantity	Value Total	Value Per Unit
Pig iron (spot value) long tons (Iron Age)	15,911,188	$279,258,547	$17.55
Copper, sales value, pounds	897,600,000	77,732,160	8.66c
Zinc, sales value, short tons	366,637	30,489,533	4.158c/lb.
Tin (U. S. deliveries) long tons	46,215	54,029,032	52.191c/lb.
Lead (pig,) sales value, short tons	297,600	22,165,248	3.726c/lb.
Aluminum, short tons	*	*	*
Silver, troy ounces, at N. Y. official price average	25,600,000	12,280,832	47.972c
Gold, troy ounces	2,900,000	74,124,000	$25.56

(a) Composite average; used as basis of total output value also.
(b) Includes some items of minor interest to metal trades not shown in table. (c) Del. Conn. Valley. (d) E. St. Louis.
(e) For years 1920 to 1927, inclusive, mercury reported by the Bureau of Mines in flasks of 75 pounds; for 1928 and succeeding years, in flasks of 76 pounds.
(f) No longer calculated separately. (g) Spot Straits average.
*Figures unavailable at date of issue.

§Average value 35c. per oz.
‡At $20.67 per ounce. Average weighted value for 1933 was $26.56 per oz.

Supply Prices, January 4, 1935

ANODES

Prices, except silver, are per lb. f.o.b., shipping point, based on purchases of 500 lbs. or more, and subject to changes due to fluctuating metal markets.

Copper: Cast ..... 16½c. per lb.
Electrolytic, full size, 14c.; cut to size 14c. per lb.
Rolled oval, straight, 14½c.; curved, 15½c. per lb.
Brass: Cast ..... 14½c. per lb.
Zinc: Cast ..... .08¼c. per lb.
Nickel: 90-92% ..... .45 per lb.
95-97% ..... .46 per lb.
99%+cast, 48c.; rolled, depolarized, 49.
Silver: Rolled silver anodes .999 fine were quoted January 15, from 57¼c. per Troy ounce upward, depending upon quantity.

WHITE SPANISH FELT POLISHING WHEELS

Diameter	Thickness	Under 50 lbs.	50 to 100 lbs.	Over 100 lbs.
10-12-14 & 16	1" to 2"	$2.95/lb.	$2.65/lb.	$2.45/lb.
10-12-14 & 16	2 to 3½	2.85	2.55	2.35
6-8 & over 16	1 to 2	3.05	2.75	2.55
6-8 & over 16	2 to 3½	3.00	2.70	2.45
6 to 24	Under ½	4.25	3.95	3.75
6 to 24	½ to 1	3.95	3.65	3.45
6 to 24	Over 3½	3.35	3.05	2.85

	Thickness	Any Quantity		
4 to 6	Under ½,	$5.00	½-1, $4.85	1 to 3, $4.75
1½ to 4	"	5.55	" 5.40	" 5.35
1 to ½	"	5.85	" 5.70	" 5.60

Extras: 25c per lb. on wheels, 1 to 6 in. diam., over 3 in. thick.
On grey Mexican wheels deduct 10c. per lb. from above prices.

COTTON BUFFS

Full disc open buffs, per 100 sections when purchased in lots of 100 or less were quoted July 2:

16" 20 ply 84/92 Unbleached	$86.21
14" 20 ply 84/92 Unbleached	66.06
12" 20 ply 84/92 Unbleached	49.63
16" 20 ply 80/92 Unbleached	71.02
14" 20 ply 80/92 Unbleached	54.50
12" 20 ply 80/92 Unbleached	41.04
16" 20 ply 64/68 Unbleached	63.43
14" 20 ply 64/68 Unbleached	48.73
12" 20 ply 64/68 Unbleached	36.75

⅜" Sewed Buffs, per lb., bleached or unbleached 49c. to 1.12

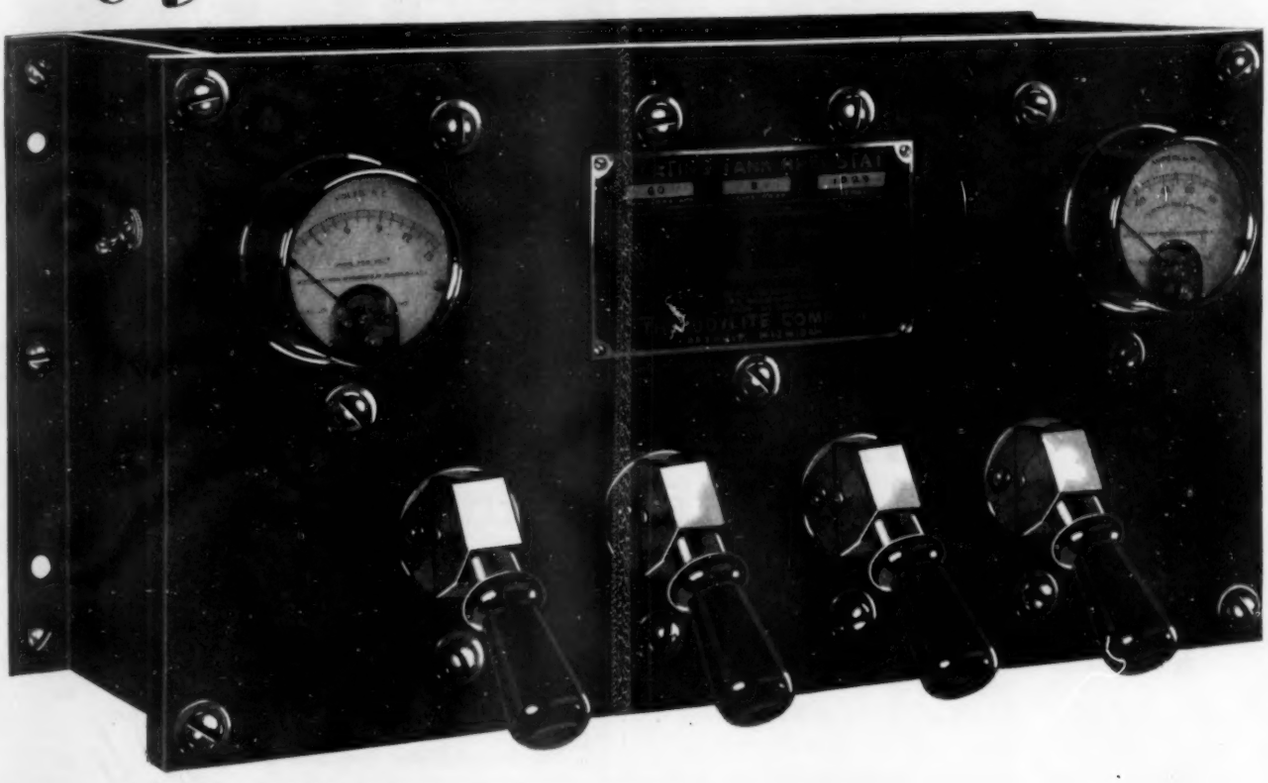
CHEMICALS

These are manufacturers' quantity prices and based on delivery from New York City.

Acetone C. P.	lb.	.13½-.16
Acid—Boric (Boracic) granular, 99½+% ton lots	lb.	.04½-.05
Chromic, 400 or 100 lb. drums		.15¾
Hydrochloric (Muriatic) Tech., 20 deg., carboys	lb.	.03
Hydrochloric, C. P., 20 deg., carboys	lb.	.06½
Hydrofluoric, 30%, bbls.	lb.	.07-.08
Nitric, 36 deg., carboys	lb.	.05-.06¼
Nitric, 42 deg., carboys	lb.	.07-.08
Sulphuric, 66 deg., carboys	lb.	.02
Alcohol—Butyl, drums	lb.	.13¼-.14½
Denatured, drums	gal.	.475-.476
Alum—Lump, barrels	lb.	.03¼-.04
Powdered, barrels	lb.	.03½-.05
Ammonia, aqua, com'l., 26 deg., drums, carboys	lb.	.02½-.05
Ammonium—Sulphate, tech., bbls.	lb.	.03½-.05
Sulphocyanide, technical crystals, kegs	lb.	.55-.58
Arsenic, white kegs	lb.	.04½-.05
Asphaltum, powder, kegs	lb.	.23-.41
Benzol, pure, drums	gal.	.41
Borax, granular, 99½+%, ton lots	lb.	.02¼-.02¾
Cadmium oxide, 50 to 1,000 lbs.	lb.	.55
Calcium Carbonate (Precipitated Chalk), U. S. P.	lb.	.05¾-.07½
Carbon Bisulphide, drums	lb.	.05½-.06
Chrome, Green, commercial, bbls.	lb.	21½-23½
Chromic Sulphate, drums	lb.	.33-.55
Copper—Acetate (Verdigris)	lb.	.21
Carbonate, 53/55% cu., bbls.	lb.	.15-.16½
Cyanide (100 lb. kgs.)	lb.	.38-.40
Sulphate, tech., crystals, bbls.	lb.	4.55-5c.
Cream of Tartar Crystals (Potassium Bitartrate)	lb.	.20¼-.20½
Crocus Martis (Iron Oxide) red, tech., kegs.,	lb.	.07
Dextrin, yellow, kegs	lb.	.05-.08
Emery Flour	lb.	.06
Flint, powdered	ton	30.00
Fluorspar, bags	lb.	.03½
*Gold Chloride	oz.	$18¼-23
Gum—Sandarac, prime, bags	lb.	.50
Shellac, various grades and quantities	lb.	.21-.31
Iron Sulphate (Copperas), bbls.	lb.	.01½
Lead—Acetate (Sugar of Lead), bbls.	lb.	.10-.13½
Oxide (Litharge), bbls	lb.	.12½
Mercury Bichloride (Corrosive Sublimate)	lb.	$1.58
Methanol, (Wood Alcohol) 100% synth., drums	gal.	.42½
Nickel—Carbonate, dry, bbls.	lb.	.35-.41
Chloride, bbls.	lb.	.18-.22
Salts, single, 425 lb. bbls.	lb.	.13-.14
Salts, double, 425 lb. bbls.	lb.	.13-.14
Paraffin	lb.	.05-.06
Phosphorus—Duty free, according to quantity	lb.	.35-.40
Potash Caustic Electrolytic 88-92% broken, drums	lb.	.07½-.08⅝
Potassium—Bichromate, casks (crystals)	lb.	.08⅝
Carbonate, 96-98%	lb.	.08¾
Cyanide, 165 lbs. cases, 94-96%	lb.	.57½
Gold Cyanide	oz.	$15.45*
Pumice, ground, bbls.	lb.	.02½
Quartz, powdered	ton	$30.00
Rosin, bbls.	lb.	.04½
Rouge—Nickel, 100 lb. lots	lb.	.08
Silver and Gold	lb.	.65
Sal Ammoniac (Ammonium Chloride) in bbls.	lb.	.05-.07½
*Silver—Chloride, dry, 100 oz. lots	oz.	.48¼
Cyanide, 100 oz. lots	oz.	.53
Nitrate, 100 ounce lots	oz.	.40
Soda Ash, 58%, bbls.	lb.	.0252
Sodium—Cyanide, 96 to 98%, 100 lbs.	lb.	.16½-.22
Beryllium fluoride ($2NaF.BeF_2$)	lb.	4.30-7.00
Gold Cyanide	oz.	$17.10*
Hyposulphite, kegs, bbls.	lb.	.03½-.06½
Metasilicate, granular, bbls.	lb.	3.55-3.70
Nitrate, tech., bbls.	lb.	.02¼
Phosphate, tribasic, tech., bbls.	lb.	.03¾
Silicate (Water Glass), bbls.	lb.	.01½
Stannate, drums	lb.	.33½-.36½
Sulphocyanide, drums	lb.	.30-.45
Sulphur (Brimstone), bbls.	lb.	.02
Tin Chloride, 100 lb. kegs	lb.	.38½
Tripoli, powdered	lb.	.03
Trisodium Phosphate—see Sodium Phosphate.		
Wax—Bees, white, ref. bleached	lb.	.60
Yellow, No. 1	lb.	.45
Whiting, Bolted	lb.	.02½-.06
Zinc—Carbonate, bbls.	lb.	.11-.12
Cyanide (100 lb. kegs)	lb.	.38
Chloride, drums, bbls.	lb.	.07½-.10
Sulphate, bbls.	lb.	.033-.037

*Gold and silver products subject to fluctuations in metal prices.

AND *Now* A RHEOSTAT



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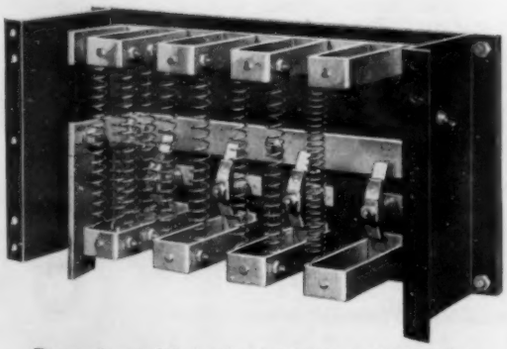

Rear view with back plate removed showing assembly of resistors and switches.

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